29 OCT 1974

9020 DOCUMENT
CONTROL SECTION

NASP–9501–05
NAS Enroute Stage A
Contract FA65WA–1395

COPY No. 4

NAS OPERATIONAL SUPPORT SYSTEM

OPERATOR'S MANUAL

IBM 9020 Data Processing System
NAS Operational Support System
(NOSS)

Model A3d2.1

15 August 1974

These change pages update this document
to make it compatible with the NOSS tapes
which support the NAS Model A3d2.1 System.

NAS Programming
IBM Federal Systems Division
NAFEC, Atlantic City, New Jersey

This (05 level) publication of the NOSS Operator's Manual is current with the NOSS composite tape labeled N3D21x.

Level	Change Proposal Date	Number	Comment
01	28 October 1970		Original Publication
02	15 April 1973		Update for A3d1.2
03	15 August 1973		Update for A3d2.0
04	15 April 1974		Update for A3d2.1
05	15 August 1974		Update for A3d2.1

x = latest tape level

CONTENTS

Section		Page
	PREFACE	ii
	CONTENTS	iii
	ABBREVIATIONS	vi
1.0	INTRODUCTION	1–1
2.0	SYSTEM INPUT/OUTPUT REQUIREMENTS	2–1
2.1	Order of Input/Output Priority	2–1
2.2	Estimating Actual Job Needs	2–2
3.0	JOB PREPARATION	3–1
4.0	CONFIGURING THE 9020 FOR NOSS	4–1
4.1	Manually Configuring a Subsystem	4–1
4.2	Configuring an Entire System Through a 1052 Typewriter	4–2
4.3	Configuring when the Monitor is Already Present in the Subsystem	4–3
4.4	Changing Subsystem Configuration	4–3
4.4.1	Manually Releasing Units	4–3
4.4.2	Releasing Units Through the Typewriter	4–4
4.4.3	Adding Units to a Subsystem	4–4
4.5	Splitting up Duplex Subset of Triplex	4–4
5.0	TYPEWRITER MESSAGES	5–1
5.1	Messages that Require No Response	5–1
5.2	Messages that Require Operator Response	5–5
5.3	Operator-Initiated Messages	5–12
5.3.1	Initial Starting Procedure Messages	5–12
5.3.2	Interrupt Messages	5–14
6.0	CONTROL CARD FORMATS AND INPUT DECK FORMATS	6–1
6.1	Batch Cards	6–1

CONTENTS (Continued)

Section		Page
6.1.1	$DATE Card	6-1
6.1.2	$END Card	6-1
6.1.3	$ENDTAPE Card	6-2
6.1.4	7/8EOF Card	6-2
6.2	Batch and Machine Run Decks	6-2
6.3	Job Cards	6-2
6.3.1	Commend Card	6-2
6.3.2	$PRINT Card	6-4
6.3.3	$PAUSE Card	6-4
6.3.4	$ID Card	6-4
6.3.5	$ENV Card	6-5
6.4	Job Type Cards	6-6
6.4.1	$NONEX Control Card	6-6
6.4.2	$XEQ Control Card	6-6
6.4.3	$AUX Control Card	6-7
6.5	Processor Control Cards	6-7
7.0	ERROR WAITS	7-1
8.0	BATCH	8-1
8.1	Introduction	8-1
8.2	Create SYSIN Tapes	8-2
8.2.1	SYSIN Creation Using Conditional Copy	8-5
8.3	Tape to Print/Punch	8-8
8.4	Tape Log	8-10
8.5	Tape Punching	8-11
8.6	Tape Duplication	8-12

CONTENTS (Continued)

Section		Page
8.7	Merged Library/Compool (MLC) Creation	8–14
8.8	Tape Comparison	8–14
8.9	Write End-of-File Tapemarks on Tape	8–17
9.0	OPERATOR AIDS	9–1

ILLUSTRATIONS

Figure		Page
1–1	IBM 9020 NOSS Programming System	1–2
6–1	Sample Machine Run Card Deck	6–3
8–1	Sample Job Deck	8–4

TABLES

Table		Page
2–1	Tape Unit and Storage Requirements of Some 9020 NOSS Processors	2–3

ABBREVIATIONS

ACES	Adaptation-Controlled Environment System
ARTCC	Air Route Traffic Control Center
ATR	Address Translation Register
BAL	Basic Assembly Language
BCD	Binary Coded Decimal
CCR	Configuration Control Register
CE	Computing Element
CSW	Channel Status Word
DE	Display Element
EBCDIC	Extended Binary-Coded Decimal Interchange Code
IAR	Instruction Address Register
I/O	Input/Output
IOCE	Input/Output Control Element
IOCEP	Input/Output Control Element Processor
IPL	Initial Program Load
JOVIAL	Jules' Own Version of International Algorithmic Language
MLC	Merged Library/Compool
NAS	National Airspace System
NOSS	NAS Operational Support System
PAM	Peripheral Adapter Module
PSW	Program Status Word
RCU	Reconfiguration Control Unit
SE	Storage Element
SPT	Symbolic Program Tape
TCU	Tape Control Unit
UCS	Universal Character Set

1.0 INTRODUCTION

The NAS Operational Support System (NOSS) is a set of processors integrated under the Utility (NOSS) Monitor that facilitates the preparation, testing, and execution of 9020 programs. The system is supplied on a single reel of magnetic tape. The organization of the system is shown in Figure 1–1 and is described briefly as follows:

a. Utility (NOSS) Monitor: The Utility (NOSS) Monitor supervises all NOSS operations and performs the following functions:

   1. Processes control cards.

   2. Loads system processors into main storage.

   3. Furnishes communication between processors.

   4. Controls Input/Output (I/O) operations and assigns I/O devices.

   5. Handles interruptions.

   6. Communicates with the operator.

b. JOVIAL Compiler: The Jules' Own Version of International Algorithmic Language (JOVIAL) compiler translates JOVIAL source programs into Basic Assembly Language (BAL) source programs.

c. BAL Assembly Program: The BAL assembler converts BAL source programs into 9020 machine-language object programs.

d. Loader: This processor loads object programs into main storage for execution.

e. Debugging System: This set of processors supplies programmer-specified dumps and traces during object program execution and provides tape dumps and emergency storage dumps.

f. Library Edit Program: This processor maintains the Library tape (containing a set of common subroutines) by adding, deleting, and inserting library routines.

g. SPT Edit Program: This processor creates and maintains Symbolic Program Tapes (SPTs). The SPT is stored card images on tape.

h. Compool Edit Program: This processor creates and maintains the tape on which the compool is stored. The compool is a collection of data definitions to which programs compiled with the JOVIAL compiler can refer during compilation.

i. System Edit Program: This processor is used to create revised versions of the system tape. It is also used to generate a system tape from a deck of punched cards.

j. Object Blocking Routine: This routine is used to place object decks onto a tape for subsequent input to the Loader.

k. Symbolic Corrector Subprogram: This processor allows symbolically coded BAL corrections to be made to a previously assembled program.

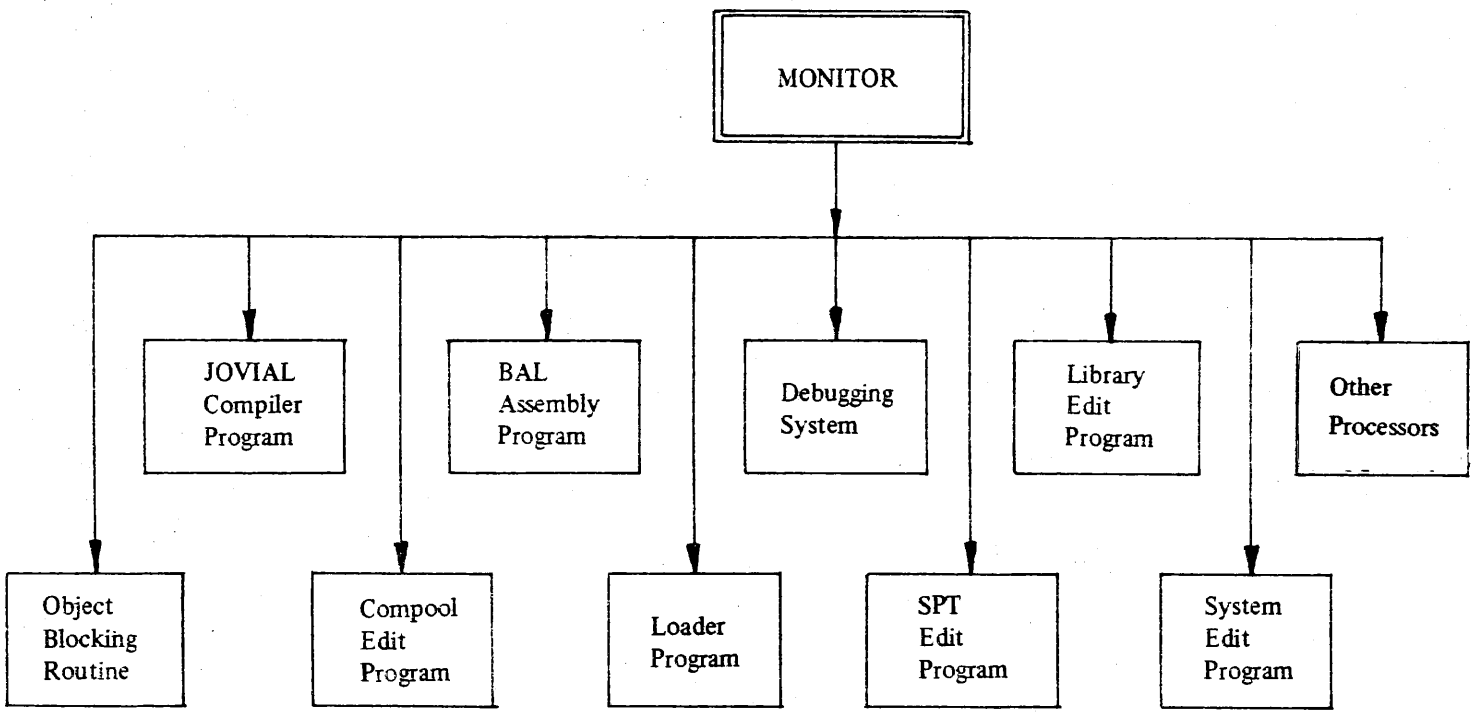

FIGURE 1–1. IBM 9020 NOSS PROGRAMMING SYSTEM

l. 9020 Autochart Subprogram: This processor generates flowcharts and pages of text information from user-supplied input cards.

m. Compool Documentation Subprogram: This processor processes a user-specified compool and produces user-specified printer listings of the compool content.

n. Compool Reference Matrix Subprogram: This processor produces a chart in matrix format showing program references to compool data and/or library routines.

o. Operational System Tape Edit Subprogram: This processor is used to generate a system tape for the NAS Enroute Operational System and to maintain the tape after it has been generated.

p. Environment Insertion Assembler Subprogram: This processor processes symbolic inputs specifying initial values to be set in storage for specified tables.

q. Simulation Subprogram: This processor creates magnetic tapes which contain simulated radar and/or air traffic controller data used as a checkout and debugging aid for the NAS Enroute Operational System.

r. Test Data Processor and Legal and Analysis Subprograms: These processors will format and print data recordings from the Legal and Analysis Tape File.

s. Adaptation-Controlled Environment System (ACES). This processor converts Air Route Traffic Control Center (ARTCC) site adaptation data into machine usable language for subsequent use by the NAS Enroute Operational System.

t. Recording Control Assembler Subprogram: This processor generates in loader compatible, overlay object deck format, the Recording Control Table and the Base Counter Table, for use by the Legal and Analysis recording functions.

u. Test Setup Subprogram: This processor translates control cards specifying Test Control options and constraints into a compool segment overlay deck to be incorporated into the data base of the NAS Enroute Operational System.

v. Prefiled Flight Plan Assembly Subprogram: This processor provides a means for advanced off-line filing and storage of repetitive flight plans for subsequent input to the Flight Data Entry function of the NAS Enroute Operational System.

For additional information about the processors, see the individual processor reference manuals.

In addition, the following documents may assist the programmer in using this manual.

a. *NAS Operational Support System User's Manual for the Utility NOSS Monitor (UTILITY),* NASP–9229–latest revision, Contract FA65WA–1395, IBM Corporation, NAFEC, Atlantic City, N.J.

b. *IBM System Reference Library IBM 9020 System Principles of Operation,* File Number 9020–01, Order Number ZA22–6852–latest revision, Contract Number FA64WA 5223, IBM Corporation, Federal Systems Division, 18100 Frederick Pike, Gaithersburg, Maryland, 20760.

2.0 SYSTEM INPUT/OUTPUT REQUIREMENTS

The NAS Operational Support System (NOSS) is designed to utilize various combinations of the following types of I/O devices, in quantities up to the indicated maximums for each type of device.

Device	Quantity
IBM 2400 Series Magnetic Tape Unit	10
IBM 1052 Typewriter	1
IBM 2540 Card Read Punch	2
IBM 1403 Printer	3

In addition, the system provides limited support to the operation of other I/O devices when requested by programs executed under its control.

When first loaded, the NOSS Monitor uses an internal table of device addresses and associated characteristics to control its testing of device availability in the present machine configuration.

2.1 ORDER OF INPUT/OUTPUT PRIORITY

Having determined the present environment, the NOSS Monitor assigns the available devices the following order of importance:

a. SYSTEM – The tape unit from which the monitor was loaded. All processors are loaded from this tape unit.

b. TYPE – The first device on the monitor's list of possible typewriter addresses which responded as ready. Monitor-operator communication is via this device.

c. .AUXIL – Tape. This tape is essential because 1) all programs to be executed are routed to the loader via this tape, 2) all program debugging data are accumulated on this tape for processing by Debug Edit, and 3) some processors not involved in the above use .AUXIL as a work tape.

d. SYSIN – Tape or 2540 Card Read/Punch. Options selected for SYSIN are:

   1. Initial assignment of tape with provision for the operator to request reassignment to the 2540.

   2. Initial assignment of tape with expected reassignment to the 2540 unless countermanded by the operator.

   3. Permanent assignment to the 2540. A SYSIN is essential because it is used to input all jobs.

e. SYSOUT – Tape or 1403 Printer plus 2540 Card Read/Punch. Options are of the same form but independent of those provided for SYSIN. A SYSOUT is essential because it is used as the standard output unit for printed output.

f. .LIB1 – Tape. All JOVIAL compilations and many job executions require .LIB1. If .LIB1 is not needed, the user can release it for his individual job by punching NOLIB in his job control card. Also, when appropriate, the operator may prepare a batch of jobs which either specify NOLIB or are known not to require a library tape and RELEASE .LIB1 at the beginning of batch.

g. .WORK2 – Tape. This tape is not essential for system operation. However, almost all types of jobs require .WORK2 in addition to the basic units.

h. .WORK1 – Tape. Many jobs require .WORK1. However, in some circumstances the operator may prepare a batch of jobs which do not require .WORK1 and RELEASE .WORK1 at the beginning of batch.

i. .WORK3 – Tape. Many jobs require .WORK3. However, in some circumstances (a single JOV compilation with no preceding object decks), the operator may prepare a batch of jobs which do not require .WORK2 and RELEASE .WORK3 at the beginning of batch.

j. .COMP – Tape. Some JOVIAL compilations and some NOSS processing jobs require .COMP. If not needed, .COMP may be released in the same manner as .LIB1.

k. .SPT1 – Tape. If not needed, .SPT1 may be released in the same manner as .LIB1.

2.2 ESTIMATING ACTUAL JOB NEEDS

Basic system I/O requirements are as follows.

a. .SYSTEM – A tape containing the NOSS monitor and all system processors.

b. .TYPE – A console typewriter for communication with the operator.

c. SYSIN – Either a tape unit for use with prestored input decks or an on-line card reader.

d. SYSOUT – Either a tape unit for later tape to print/punch processing or an on-line printer and on-line punch.

e. .AUXIL – A tape to accumulate object decks and debug data during each job.

Additional NOSS processor requirements are indicated in Table 2–1. For requirements not appearing in Table 2–1, refer to the Operator's Manual for the specific program.

TABLE 2–1. TAPE UNIT AND STORAGE REQUIREMENTS OF SOME 9020 NOSS PROCESSORS

Processor Control Cards	WORK2	WORK1	WORK3	LIB1	COMP1	SPT1	Other	Total Tape Units[1]	Total Storage Elements[2]
$BAL	O[8]			O[4]	O[4]			5–6	1–8
$CMPEDT	R			O[3]	O[3]			5–6	2–8
$JOV	R	R	O[7]	R	O[4]			7–9	2–8
$LIBEDT	R			O[3]				5–6	1
$OBJ								4	1
$SPTEDT	R			O[3]		O[3]		5–6	1
$SYSEDT	R			O[3]				5–6	1
$XEQ				O[5]			O[6]	4–up	1–up

R = Required

O = May be required, depending on user options

NOTES

1. *Indicated requirements are for a job containing only the indicated processor and using tapes for SYSIN and SYSOUT. For jobs using several processors, each tape required by any processor will be required. For system operation with the on-line reader, subtract 1; also for operation with the on-line printer and punch, subtract 1.*

2. *Where storage requirements are indicated as variable, actual requirement is input-dependent and coordination with the user may be necessary.*

3. *Required only for R-type edit. If .LIB1 is not assigned, the alternate unit (if any) is used for the old master tape. When neither .LIB1 nor the alternate is available, the edit terminates.*

4. *Required only if the JOVIAL or BAL start card specifies POOL. The compool may be released under this condition if an MLC tape (Merged Library-Compool) is mounted on the .LIB1 unit and it contains the correct library and the correct compool.*

5. *Required unless all external references by object decks are to other decks included in the job. (i.e., required if the program to be loaded references one or more library routines).*

6. *Each $UNIT card specifying tape adds 1 to execution time requirements. However, total job requirements are the greater of either $XEQ alone or all other control cards together.*

7. *WORK3 may be released on a JOVIAL Compilation if the JOVIAL deck is the first deck in the job and the only JOVIAL Compilation in the job.*

8. *WORK2 is used as a scratch tape if the program being assembled will not fit entirely in core.*

3.0 JOB PREPARATION

Before an attempt is made to run jobs under control of the NOSS Monitor, the requirements of the various jobs must be evaluated and the jobs grouped and sequenced according to equipment availability and other requirements.

a. Jobs requiring many tapes must be segregated to be run when the necessary units are available. Requirements before execution must be evaluated when work, library, compool, and SPT tapes are required, but requirements during execution should be evaluated when any or all of these can be replaced by tapes specified on $UNIT cards. Tape requirements for the various NOSS processors are given in Section 2.0. All tape counts assume off-line SYSIN (i.e. tape) and off-line SYSOUT (i.e. tape) and should be adjusted if either or both are on-line. The $UNIT cards to be considered separately as requirements for execution are: .SYSTM, .AUXIL, SYSIN, SYSOUT, .LIB1 (unless user specifies NOLIB on his XEQ card). One drive should be added for each $UNIT card specifying tape.

b. Processors LIBEDT, SPTEDT, SYSEDT, and CMPEDT require only two tapes above basic system requirements (See Section 2.0).

c. Jobs that, in common, do not require a particular tape (such as SPT) or a particular group of tapes should be selected to run in the same batch.

d. Jobs requesting USER control must be segregated to run when this mode of operation is permissible, and unless known to be debugged, should be the last job in the batch. USER control permits the problem program to have complete control of the system and, aside from affecting the job being run, can have unpredictable effects on any following job in the same batch. However, the possibility of harm to a following batch in the same machine run is negligible.

Prepare each batch of jobs for on-line operation or load one or more batches on a system input tape (see Section 8.0, BATCH). If any user has specified "BATCH PROCESSOR" as his Job Request Form, it must be used to generate a system input tape. To set up a batch of jobs, complete the following procedure.

a. Place a 7/8EOF card after each job.

b. If tape requirements for consecutive jobs conflict (different SPT tapes, different library tapes, or different compool tapes), place a $PAUSE card between the jobs. The system will automatically pause when appropriate for mounting and dismounting of tapes specified on $UNIT cards.

c. Place a $END card in front of the 7/8EOF card after the last or only job in each batch.

d. Because of the various restrictions on batch size, it may be desirable to group several batches together when preparing a tape for off-line input. Because of this possibility, the operator and NOSS cannot depend on $END cards to indicate end-of-tape on system input, and the last batch on any tape should be terminated by a $ENDTAPE card instead of a $END card.

e. If using BATCH, proceed according to its rules.

4.0 CONFIGURING THE 9020 FOR NOSS

There are several ways to configure the 9020 for NOSS, depending on the conditions under which the operator is to configure.

4.1 MANUALLY CONFIGURING A SUBSYSTEM

To manually configure for NOSS the operator must select the subsystem he wishes to configure. A subsystem consists of a Computing Element (CE), an Input/Output Control Element (IOCE), one or more Tape Control Units (TCUs), one or more Storage Elements (SEs), and a 1052 typewriter. A Peripheral Adapter Module (PAM) may or may not be present, depending on the particular subsystem being configured. (i.e., a 1052 console typewriter may be connected to a PAM or hard wired to the System Console.) Perform the following procedure.

a. Set the Address Translation Register (ATR), Configuration Control Register (CCR), and the SCON bit on the CE.

b. Set the CCR and the SCON bit on the IOCE.

c. Set the appropriate SCON bit and IOCE bit in the TCUs and SEs.

d. If a PAM is to be used, set the appropriate SCON bit and IOCE bit in the PAM.

e. On the CE, select an SE into which the NOSS Monitor is to be loaded.

f. On the CE, select the tape drive from which the system tape is to be read. (The system tape must be on this drive and at load point.)

g. Depress the LOAD button on the CE and expect "NOSS IPL!" to be typed on the console typewriter. If unsuccessful, an error was probably made in setting the load switches.

h. If the CE was permitted to SCON, verify that its Configuration Register indicates exactly the units expected.

i. Be sure any 7-track tape drives have tapes mounted and ready. (Otherwise, sense information may incorrectly indicate that they are 9-track drives. Note that the NOSS Monitor makes this test only at Initial Program Load (IPL) time.)

j. Type and enter the batch control message. (See Section 5.0 for a description of available options.)

k. Inspect the Mounting message for the expected unit assignment. Be sure to note whether it was preceded by any tape diagnostic messages. These are caused either by tape still rewinding from the previous batch, in which case the IPL sequence should be repeated; or by apparent hardware errors, which must be resolved before the affected drives can be used by NOSS.

l. Mount appropriate tapes on drives assigned for the first job, and depress the ENTER key. The IPL is complete.

NOTE: When only a limited number of tape drives is available, this initial assignment may not be suitable for the first job. If so, a supplementary mounting message will be issued after the job type cards for the first job are read.

4.2 CONFIGURING AN ENTIRE SYSTEM THROUGH A 1052 TYPEWRITER

To configure an entire 9020 system through a typewriter, the operator must load the NOSS Monitor and type the appropriate configuration messages.

The following procedures are used.

a. Using the Interlock Key on the System Console, set the system into State 3.

b. On the System Console, select a CE for the master system.

c. On the System Console, select the SE into which the NOSS Monitor is to be loaded and the tape drive from which the Monitor is to be loaded.

d. Ensure that the system tape is mounted on the correct tape drive and is at load point.

e. Depress the LOAD button on the System Console and expect "NOSS IPL!" to be typed. If unsuccessful, check the switches set on the System Console.

f. In response to this IPL message, the operator must reply with the configuration he wants for each subsystem. The operator will load the master subsystem and indicate all units given to other subsystems and the receiving for each. This is done with a CONF message. In order to respond with this message the operator must know the element code for all units. The codes are as follows.

CE1 = 11	SE1 = 21	IOCE1 = 31	TCU1 = 41	PAM1 = 51 or C1
CE2 = 12	SE2 = 22	IOCE2 = 32	TCU2 = 42	PAM2 = 52 or C2
CE3 = 13	SE3 = 23	IOCE3 = 33	TCU3 = 43	PAM3 = 53 or C3
CE4 = 14	etc.		TCU4 = 44	
	SE10 = 2A			
	SE11 = 2B			
	SE12 = 2C			

NOTE: All 9020E Users should note that Display Elements (DEs) are considered SEs 6 through 10 and Reconfiguration Control Units (RCUs) are considered PAMs.

Note the first number of all CEs in 1, the first number of all SEs in 2, etc.

The operator must type in the configure message and units which are to be given away in the following order: CE, SE(s), IOCE, TCU(s), PAM(s). A period (.) separates the element codes. The period must appear after the CONF message and after each element code except the last one. For example, the following configuration message may be typed on a triplex:

CONF.12.25.26.27.32.42.52.13.2C.33.43

In this example, System A (CE1) is the Master System.

System B (CE2) contains SEs 5, 6, and 7, IOCE 2, TCU2, and PAM 2.

System C (CE3) contains SE 12, IOCE 3, and TCU 3.

System A contains everything else (i.e., CE1, SEs 1, 2, 3, 4, 8, 9, 10, and 11, IOCE 1, TCU 1, and PAMs 1 and 3).

The NOSS Monitor will use the configure message to configure all subsystems, set the appropriate SCON bits and IOCE bits, and set the system back to State 0. Then it will type "NOSS IPL!" again. Then the operator must enter the batch control message (see subsection 4.1, steps g -- k).

NOTE: At this time only the Master System has been IPLed. To IPL any of the subsystems the operator must load a system tape from the appropriate CE. If the operator responds to the first IPL message with only CONF., the NOSS Monitor will configure every available unit to the master system.

4.3 CONFIGURING WHEN THE MONITOR IS ALREADY PRESENT IN THE SUBSYSTEM

If the operator has configured the system and terminated a batch of jobs and wants to begin a new batch using the present configuration, he must type in the IPL or REIP messages (described in subsection 5.3). This will cause exactly the same subsystem to be configured as for the previous batch. This IPL will be performed automatically for a normal end of batch.

4.4 CHANGING SUBSYSTEM CONFIGURATION

In order to change the subsystem configuration, the operator must determine from which subsystem he wants to release units and to which subsystem he wants to add units. Releasing units from a subsystem may be accomplished manually or through the typewriter.

4.4.1 Manually Releasing Units

When releasing units manually, the following steps are taken.

a. Set up load switches appropriate to the configuration after releasing units; be sure the CE ATR permits IPL, and be sure the CE can SCON.

b. Be sure the system tape is at load point and do an IPL. Expect "NOSS IPL!" to be typed.

c. Inspect the CE Configuration Register – it should include all units in the subsystem.

d. Place RATE switch to INSN STEP position and do an IPL. ("NOSS IPL!" will not be typed until completion of step f.)

e. Set up a select mask for units to be released to the other subsystem and store in location 000080. (Select mask is identical with the configuration mask, except bits 0, 1, and 2 select PAMs 1, 2, and 3 and bits 3, 4, and 5 select TCUs 1, 2, and 3. Also, for present purposes, only one CE may be selected.)

f. Turn RATE switch to PROCESS and depress START Key. Expect "NOSS IPL!" to be typed.

g. Inspect unit configuration messages. The units are now free.

4.4.2 Releasing Units Through The Typewriter

To release units through the 1052 console typewriter, the subsystem must be IPLed (other than the normal end-of-batch IPL) and the subsystem giving up the units must be in States 0 or 3 with the CE SCON bits set in the CCR. Type in a CONF message indicating the CE to which these units will be transferred and which units are to be released. Depress the ENTER Key. The units are now free.

4.4.3 Adding Units To A Subsystem

Units previously released from one subsystem may be added to another subsystem either manually or through the typewriter.

4.4.3.1 Manually Adding Units to a Subsystem. To manually add units to a subsystem, use the following procedures.

a. Unless the CE ATR in the subsystem is completely correct, set it to include only the IPL SE.

b. After checking that the system tape is at load point, IPL the subsystem, enter an appropriate IPL message, and inspect the mounting message and CE ATR for correctness.

The units are now added to the subsystem.

4.4.3.2 Adding Units To a Subsystem Through The Typewriter. To add units made available from other subsystems via the 1052 Console Typewriter, the NOSS Monitor must be IPLed.

The NOSS Monitor will automatically acquire the units without any operator action, provided the CE is in State 0 and the CE SCON bit is set.

4.5 SPLITTING UP DUPLEX SUBSET OF TRIPLEX

If a triplex was subdivided into a duplex and simplex for NAS support, and the duplex is now to be released for NOSS use as two simplexes, and a system IPL can not be done because the current simplex user can not be interrupted, the following sequence of operations should be used to separate the duplex into two simplexes.

a. Do a subsystem IPL into one of the two CEs (CE X).

b. Enter a CONF message to give away the other simplex's elements (and CE Y).

c. Manually set off the SCON bit for CE Y in CE X's CCR.

d. Manually set off the SCON bit for CE X in CE Y's CCR.

e. Complete the subsystem IPL of simplex X.

f. Do a subsystem IPL of simplex Y.

5.0 TYPEWRITER MESSAGES

This section is divided into three parts. The first part describes all system typewriter messages that do not require an operator response. The next part describes the system typewriter messages that require operator response (the proper response is indicated in the discussion of the message). The last part describes all messages the operator may enter on the typewriter.

Note that this section discusses only messages issued by NOSS. Messages issued by individual processors are discussed in individual processor descriptions. Messages issued by BATCH and operator responses are discussed in Section 8.0.

In general, the messages discussed in each part are listed in alphabetical order. Those messages outputted via both the console typewriter and SYSOUT are described both in this section and in the *9020 Utility User's Manual.*

NOTE: The 1052 read buffer is not re-initialized via the CANCEL key. The following example illustrates the point.

Operator types	123456
Operator hits CANCEL key	
Operator types	9876
Operator depresses ENTER key	
Program finds in 1052 read area	987656

To prevent this undesired situation, the operator must enter trailing blanks if the proper response is shorter than the incorrect response which was CANCELed.

5.1 MESSAGES THAT REQUIRE NO RESPONSE

The following messages are typed on the typewriter by the system, with no operator response or action required.

***xxxxxx NOT A SYSTEM PROCESSOR**

or

*** – – OUT OF SEQ OR INV CD – –**

A system control card is invalid or out of sequence. xxxxxx are columns 2–7 of the system control card in question.

***BATCH TERMINATED**

The batch has been prematurely terminated.

***CAN'T FIND REQUESTED JOB**

Operator either has requested SKIP to a job that did not exist between current tape position and the $ENDTAPE card or has requested REST to a job that did not exist between load point and the current tape position. The batch is terminated. If the desired job is known to be on the tape but was not found because its position was not known, manually rewind SYSIN and request program SKIP to the job.

***COMPOOL xxxxxxxx IN INDEX BUT NOT ON TAPE**

Compool tape is defective. Return this typeout to the user.

***DEBEDT**

Execution of the debug edit portion of the debugging system has begun.

***END OF BATCH – PT.HH/mm L.XXXXXX C.XXXXX**

Normal or operator – requested end-of-batch has been reached. The system has encountered the $END or $ENDTAPE control card and has finished processing the batch.

If SYSOUT has been on-line, only "END OF BATCH" is printed. If SYSOUT has been to tape, the entire message is printed. Content of the new fields is as follows:

PT.HH/mm	–	Estimated print time for this batch assuming a high-speed printer (i.e., 1100 lines per minute). If a low-speed printer is to be used for printing, double this estimated print time.
L.XXXXXX	–	Lines outputted to SYSOUT during this batch.
C.XXXXX	–	Punch cards outputted to SYSOUT during this batch.

Having successfully completed this batch the monitor automatically initiates the IPL sequence in preparation for the next batch.

***END OF JOB**

Normal end-of-job has been reached. The system has encountered the 7/8EOF control card and has completed processing the job.

***ERR ON BASIC UNIT**

The system has encountered an error or unexpected end-of-file on a basic system unit. The job will be terminated.

***ID MISSING**

The $ID control card for this job is either missing or out of place. The system generates a blank name for the job and continues processing.

***INSUFFICIENT NUMBER OF IO UNITS AVAILABLE**

A problem program has asked for too many units by means of $UNIT control cards or has requested a device currently being used by the monitor (for example, the card reader when it has been designated the system input unit). This message also occurs if the programmer specified a tape on a $ENV control

card and the corresponding tape unit has been released by means of the RELEASExxxxxx message or if not enough basic units are available at the beginning of the batch.

***JOB TERMINATED**

The job has been prematurely terminated either because of an error or because of an operator-initiated message.

***LISTGN**

The generation of LISTIOs for problem program I/O units has been initiated. Since a **MOUNT message will follow, the operator should consult the job request forms for any special reel-mounting instructions. No actual response is required.

***LOADING**

Loading has begun.

***LOADING ERROR NO XEQ**

The loader has found an error while loading. Execution has been suppressed.

***SUPPRESSED LOADING**

The job will not be loaded into main storage because of errors detected during the processing of the job. This message may also appear if the operator requested, by means of an operator-initiated message, that the job be skipped.

***UNEXPECTED EOF, EOT, OR ERROR**

An unexpected end-of-file was encountered while reading; or an unexpected end-of-tape was encountered while writing; or a permanent I/O error has been encountered (to which the operator typed in CONT). To eliminate this diagnostic (and dump), the user should initialize EOF/ERR returns with SVC SYSSTR.

***NONEX ASSUMED**

A $XEQ, $AUX, or $NONEX control card was not found. The system assumes that the job is a non-execute job and that the job requires the library, SPT, and compool tapes.

***NO LIB – NO JOVIAL**

The programmer has requested a compilation (by means of a $JOV control card) but has specified NOLIB on his $XEQ or $NONEX card control card. This message is also issued if compilation is requested by means of an operator-initiated message. This message is also issued if the library tape has an invalid label.

***OBJ ERR, SAVE PUNCH OUTPUT**

Object blocking routine has detected an error in an object deck. It prints its analysis of the error and also punches the defective card(s) as read into storage. Return these punched cards to the user for analysis regardless of whether he asked for normal punched output. (The defective cards in the punch hopper are preceded by a flag card which appears to be punched W when held at arm's length.)

***REQUEST REJECTED**

The operator has asked the monitor to terminate a job (by means of an END message), but the monitor has already initiated end-of-job procedures.

***SYSDUMP**

A dump of main storage onto the .AUXIL tape has been initiated because of an error or operator-initiated message.

The debug edit portion of the debugging system is then called in to edit the dump.

NOTE: The operator may allow the dump to conclude or he may interrupt the dump and use a SKIP message to terminate the dump.

***TPDUMP**

Execution of the tape dump portion of the debugging system has begun.

NOTE: Input/output errors occuring on problem program units at this time are not necessarily equipment failures. (For example, the programmer wrote 10 records on tape but asked for 20 to be printed. This may cause a parity check.) If an I/O error did occur at this time on a problem program unit, a CONT message would end dumping on the "faulty" unit and start the next dump requested. (Descriptions of the messages that indicate I/O device failures are listed in the following paragraphs.)

UNIT XXX CHAN BUSY

In response to a TIO operator message, the monitor has found that device xxx has an operation requested but not yet started, and the monitor attempts to initiate the operation.

UNIT XXX NOT READY

In response to a TIO operator message, the monitor has found that device xxx is indicated to be not ready. Since such indications are not always correct, the monitor attempts to initiate the pending operation.

UNIT XXX UNIT BUSY

In response to a TIO operator message, the monitor has found that device xxx is indicated to be currently busy with an I/O operation.

UNIT XXX SENSE/RETRY xxxxxxxxxx

Detected errors on the unit xxx caused MONIO to read the sense information typed in this message. Later, MONIO will analyze the data and, in a separate message, ask for action (if appropriate). Occasional SENSE&RETRY messages do not, alone, indicate unacceptable machine operation, and in some cases are the result of correct operation. However, frequent messages indicate trouble that should be corrected.

***XEQ**

Problem-program execution has begun.

***PROCESSOR NAME**

The name of each processor called by a $ control card is typed each time the processor is called. The Operator's Manuals for the individual processors should be referenced for any information about the processors.

5.2 MESSAGES THAT REQUIRE OPERATOR RESPONSE

The following messages are typed by NOSS and require operator response as indicated.

ADR(6), LTH(4)

In response to the operator-initiated message PRIN, the system is requesting a second message of the form xxxxxx,yyyy, where xxxxxx is the starting address and yyyy is the length of the areas to be dumped on the on-line printer.

Response: Enter the desired parameters.

INPUT DATE, FORMAT MM/DD/YY

A $DATE cardwas not processed prior to the first job of this batch. Operator must input date via 1052 in format requested (i.e.,MM/DD/YY). This date will be used for all subsequent jobs in this batch.

CARD

In response to the operator-initiated message PATC, the system is ready to read a patch card.

Response: Type, in the same form as would be punched, an REP card (the full 80 columns need not be filled in). This cycle will be repeated for as many cards as are to be entered in this way. After the last card, the response is BEGIN. The first character of all REP cards is a blank and the first character of the BEGIN card is a blank.

CONTINUE WITH MESSAGE xxx

In response to "NOSS IPL!" the operator has attempted to enter more messages that can be accepted in a single read.

Response: Continue entering operator messages, starting with the indicated message.

END OF TAPE

The system has read a $ENDTAPE card.

Response: Mount a new system input tape before starting the next batch. (System design reserves this card for use at the end of the last batch when several batches are loaded on the same tape.)

***ENTER REQUEST**

The operator has depressed the interrupt key on the system control panel or the system 1052, and the system is waiting for an operator-initiated message.

Response: The operator can now enter an END, TERM, REST, SKIP, IPL, REIP, PATC, PRIN, or CONT message. (See subsection 5.3 for a detailed description of these messages.)

***ERR COND 3**

A processor has returned control to the NOSS Monitor, but all processor classification flags are off.

Response: Ready printer for emergency dump of main storage. Inform the analyst responsible for maintaining the system.

***ERROR IN OPERATOR MESSAGE RE–ENTER MESSAGExxxx**

where:

xxx is the number of the message.

This message is caused by operator-initiated message errors during the initial starting procedure. For example, if the operator enters USEREADER and presses the carriage return, types DETACHxxx and presses the carriage return, enters CONT and presses the ENTER key, the monitor indicates that message 2 is in error.

Response: Re-enter indicated message, and depress ENTER key. In the above sample, enter DETACHxxx and depress the ENTER key.

NOTE: The operator can delete the erroneous message by pressing the ENTER key without re-entering the message.

***ID**

In response to the operator-initiated message REST or SKIP, the system is ready to accept a specific job identity.

Response: To SKIP to or REST at the following job, depress the ENTER key. To select a specific job, type its job identity. Job identity is in columns 10–15 of the $ID card for this job.

***RETYPE PATCH CARD**

Contents of the rejected patch card are typed on the next line.

PROGRAM WAITING

The system, reading debugging patches from the system input unit during batch execution, has encountered an invalid card and typed it after this heading message.

Response: Type a correct replacement card, or if this is impractical, terminate the job or batch.

MOUNT xxxxxx ON yyyyy – SYSTEM WAITING

where:

xxxxxx is a library tape label, a compool name, or an SPT tape label, depending on whether yyyyy is .LIB1, .COMP, or .SPT1, and any tape on the corresponding drive has been unloaded by the NOSS Monitor.

Response: If possible, mount the specified tape and depress the ENTER key.

If the problem is found to be an error in the $ENV card, mount or remount the proper tape, type OVER, and depress the ENTER key. Otherwise, type SKIP and depress the ENTER key to terminate this unsuccessful job with minimum wasted time.

****MOUNT IF REQUIRED L. U. xx xxx xxxx PROTECT**

where:

L. U. means logical unit.

xx is the logical unit number assigned by the programmer.

xxx is the physical unit number of the I/O device.

xxxx is either the reel number, NORL, or blank if a $REEL card is not present.

PROTECT, if present, indicates that the reel should be file-protected.

This message continues to list all logical units needed by problem programs included in the current job. This message is issued just before the job is loaded for execution.

Response: Mount requested reels as directed.

NOTE: If there is no $REEL card, a SYSTEM WAITING message will be issued following this message, provided that a system unit is to be detached or that a reel requested to be saved by a prior job is now mounted on the unit specified in this message.

****MOUNT**
.SYSTM xxx
SYSIN xxx
SYSOUT xxx
etc.

where:

xxx is the physical unit number of the I/O device.

This message is issued for system units following initial program loading if requested by the operator by means of a TYPE message or if his messages have affected unit assignment.

Response: Mount the required system tapes on the designated units.

NOTE: At the end of the message, a SYSTEM WAITING message will be typed.

MOUNT SCRATCH ON SYSOUT

An end-of-tape condition has been encountered on SYSOUT.

Response: Mount a scratch tape on the unit designated SYSOUT. The monitor resumes processing when the new reel is readied.

MOUNT TAPE WITH COMPOOL xxxxxxxx

The JOVIAL compiler could not find the user-specified compool on tape and has unloaded the tape.

Response: If the required tape is available, load it. If not, use the SKIP operator-message to terminate the job. (The typeout specified the required compool name as this was the only available information. Common causes for this printout are leaving a standard compool tape mounted when the user requested a non-standard tape or leaving a non-standard tape mounted when the user requested a standard tape. In these cases, corrective action is obvious and will enable the job to complete successfully.)

NO UNIT AVAILABLE FOR .INPUT

Sufficient I/O equipment is not available. Such is the case when .INPUT is to be assigned to a tape and there is no available tape or when .INPUT is to be assigned to the reader and the reader is not available. The batch is terminated.

Response: Make more equipment available if possible, and reload the system.

NOTE: The operator can alter the system requirements at IPL time.

NO UNIT AVAILABLE FOR .OUTPUT

Sufficient I/O equipment is not available. Such is the case when .OUTPUT is to be assigned to a tape and there is no available tape or when .PRINT and .PUNCH are to be assigned to the printer and punch, and the printer and punch are not available.

Response: Make more equipment available if possible, and reload the system.

NOTE: The operator can alter the system requirements at IPL time.

NOSS IPL!

Initial program loading is complete, and the NOSS monitor is now awaiting an operator message.

Response: Any of the following messages may be entered: DETACHx, DETACHxxx, RELEASExxxxxx, SYSI, SYSOUT=TAPE, USER, USEP, TYPE, BATCH, NOPR, CONF: xx . xx . . .(see Section 4.0). The minimum response to the NOSS IPL! message is depress the ENTER key.

NOT ENOUGH SEs FOR JOVIAL

The JOVIAL compiler is unable to operate in available storage using the compool specified by the user.

Response: Depress the ENTER key, and rerun the job with more storage configured in the NOSS subsystem.

ONLY ANSWERS REPE CONT IPL

The operator has entered an incorrect message in response to an I/O error message.

Response: Enter message REPE, DETA, IPL

$PAUSE Comment

where:

Comment is a reproduction of the information punched on the $PAUSE control card.

This message is issued when a $PAUSE control card is encountered.

Response: Perform the action requested in comment; Then depress the ENTER key.

PROGRAM WAITING

The monitor is waiting to read from the typewriter because a problem program requested a wait via SVC SYSWAT.

Response: Perform whatever actions were requested in messages before the "Program Waiting." Then depress the ENTER key.

READY PRINTER

The monitor is attempting to set the Universal Character Set (UCS) buffer and has found the printer not ready.

Response: Ready the printer.

****READY UNIT xxx**

where:

xxx is the physical unit number of the specified device.

The system is waiting for the operator to ready the specified unit.

Response: Ready the specified device, and depress its start button. This may involve removing card jams, reloading forms, emptying a chip box or a full stacker, etc., before depressing the start button.

REPEAT

After entering the operator-initiated message PATC, the operator has typed an invalid patch and the system has rejected it.

Response: Retype the offending card correctly.

***REQUIRE MOD=USER**

This job requires permission to enter supervisor mode and/or to modify the NOSS Monitor during execution, but the operator has not permitted this (USER message at start of batch).

Response: If the cause of this message was operator oversight in not including the USER message at start of batch, type USER and depress the ENTER key. Otherwise, depress the ENTER key to terminate this job.

***REQUIRE SES=n**

This job requires n storage elements but less than n were configured for this batch.

Response: Depress the ENTER key to terminate this job, and rerun it when the required amount of storage is available.

***REQUIRE SYS=xxxxxx**

This job requires the system type labeled xxxxxx, which was not mounted.

Response: Depress the ENTER key to terminate this job, and rerun it with the specified system tape.

SYSERR

A machine and/or system error has been detected by the system.

Response: Ready the printer to receive emergency dump of storage. Inform the analyst responsible for maintaining the system.

SYSOUT FAILED

An uncorrectable I/O error has been encountered while writing on the output tape (SYSOUT). This printout occurs after the operator responds to an I/O error message for this unit with a CONT message.

Response: Rerun batch with a new tape.

NOTE: See the I/O error messages described later in this section.

SYSTEM WAITING

The monitor is waiting for the operator to mount reels. This message follows the **MOUNT message.

Response: After mounting tapes as requested, depress the ENTER key.

UNIT ASSIGNMENT ERROR

A system and/or machine failure has been detected during unit assignment.

Response: Ready the printer to receive emergency dump of storage and inform analyst responsible for maintaining the system.

UNIT xxx CC=3 ON INITIATION

where:

xxx is the physical unit number.

This indicates that the designated unit set a condition code of 3 (not available) on initiation of the last I/O command.

Response: Check whether the device has been switched off-line or has been made unavailable to the system by some other means. Correct the malfunction, if possible, and enter a REPE message to repeat the operation. The following messages may be used to bypass or pinpoint the malfunctions.

a. **CONT** – This message causes the system to take an error return that has been specified by the programmer. If the programmer has not specified an error return, the monitor terminates the job. This message should not be used if the symbolic name .INPUT, PRINT, .PUNCH, .SYSTM, or .AUXIL has been assigned to the affected unit.

b. **IPL** – Terminate current job and do software IPL to possibly DETACH the failing unit using the IPL DETACH operator message.

c. **REPE** – This message causes the system to re-execute the I/O command that resulted to the unit failure.

UNIT xxx CC=0 TO CONTROL

where:

xxx is the physical unit number.

The indicated unit has responded to command with a condition code of 0 that should result in a condition code of 1, thus showing a status error.

Response: Options are the same as for the UNIT xxx CC=3 error message.

UNIT xxx BAD STATUS yyyy

where:

xxx is the physical unit number.

yyyy is the channel status reported by that unit.

Probable causes of this message are malfunctioning channel controls, parity errors, etc. (See *IBM 9020 System Principles of Operation,* Form A22–6528, for a detailed description of the channel status bytes.)

Response: The options are the same as for the UNIT xxx CC=3 ON INITIATION message.

UNIT xxx SENSE FAILS

where:

xxx is the physical unit number.

This message indicates that the specified unit failed to accept a sense command or failed to store sense bytes.

Response: The options are the same as for the UNIT xxx CC=3 ON INITIATION message.

UNIT xxx SENSE RESULT xxxxxxxx

where:

xxx is the physical unit number.

xxxxxxxx are the sense bytes.

This message shows that the specified unit reported the indicated sense bytes. Sense bytes are obtained when a device signals a unit check in the Channel Status Word (CSW) for that unit. This occurs for such malfunctions as a parity error on tape, a validity check on the card reader, or a hammer check error on the printer.

Response: The options are the same as for the UNIT xxx CC=3 ON INITIATION message.

UNIT xxx STATUS yyyy BAD ON SENSE
UNIT xxx STATUS yyyy BAD ON RELEASE
UNIT xxx STATUS CC=z BAD ON SENSE
UNIT xxx STATUS CC=z BAD ON RELEASE

where:

xxx is the device address

yyyy is the status field of a CSW stored on SIO or TIO.

z is a condition code.

In testing for device access paths at batch IPL time, NOSS received either inconsistent or completely unacceptable response to sense or release commands or related TIO instructions.

Response: Select one of the following.

a. Re-IPL NOSS because the problem was a tape in rewind status which is now at load point.

b. Continue with the batch because the problem is known to be a hardware error that prevents use of the device.

c. Request assistance from maintenance personnel.

UNIT xxx EQUIP CHECK xxxxxxxx

where:

xxx is the physical unit number.

xxxxxxxx are the sense bytes.

EQUIP CHECK indicates a hardware malfunction (considered as permanent) and the error exit as specified in the LISTIO is taken *without* operator intervention.

5.3 OPERATOR–INITIATED MESSAGES

The messages that can be initiated by the operator fall into three groups:

1. Messages used after IPL has been completed during the initial starting procedure.

2. Messages used following an operator-initiated interrupt.

3. Messages used following an I/O error message.

5.3.1 Initial Starting Procedure Messages

During the initial starting procedure, the operator may use the following messages in response to the "NOSS IPL!" message.

BATCH

This message causes the BATCH processor to be called instead of initiating normal job processing. It also causes the on-line card reader to be selected for system and the on-line printer and punch to be selected for system output. (See Section 8.0 for further description of BATCH.)

CONT

This message causes the monitor to continue processing the current batch.

NOTE: This message is also used as a response to several system messages. Its significance is slightly different in each case, but this difference is indicated in the description accompanying the affected messages. This message need not be typed as the system will interpret as CONT either the typing of four spaces or, if the CANCEL key has not been used for this message, depressing the ENTER key without typing.

DETACHx

where:

x is the hexadecimal address of a malfunctioning channel that will not be available to the system during the processing of the current batch.

This message causes the monitor to assign to other channels if possible, or consider unavailable all devices normally assigned to this channel.

DETACHxxx

where:

xxx is the hexadecimal address of a malfunctioning device that will not be available to the system during the processing of the current batch.

This message causes the monitor to assign another unit to take the place of the specified unit. This message is used to detach a malfunctioning unit. (NOSS automatically detects and provides for missing units. This message is for attached but defective units.)

NOPR

This message causes NOSS to bypass setting up the UCS buffer in the on-line printer. It may be used if the printer is attached but cannot be made ready or if (in special cases) NOSS is not to be permitted to load the UCS buffer. (When used, it must be the first operator message entered.)

RELEASExxxxxx

where:

xxxxxx is the symbolic name of a tape unit that will not be required by the system during the processing of the current batch.

This message allows the monitor to assign the affected unit to another system function. This message may refer only to units that normally perform system functions, not to the basic system units. For example, the symbolic unit names .LIB1, .COMP, .SPT1, .WORK1, .WORK2, or .WORK3 may appear in this message. The names .INPUT, .OUTPT, .AUXIL, .SYSTM, or .TYPE may not appear because the system will always need the function associated with them.

SYSI

This message inhibits a monitor reassignment of system input from tape to the card reader (appropriate when using system tapes with scheduled initial assignment of tape for SYSIN when the tape also specifies reassignment to the card reader).

SYSOUT=TAPE

This message inhibits monitor-scheduled reassignment of SYSOUT from 9-track tape to the on-line printer and punch (appropriate when using system tapes with scheduled initial assignment of tape for SYSOUT when the tape also specified reassignment to on-line equipment).

TYPE

This message causes the monitor to type unit assignment information at the start of batch.

USER

This message causes the monitor to permit problem programs to place themselves in supervisor mode. (In this mode of operation, the NOSS Monitor relinquishes all system control to the problem program. Therefore, it may not be permitted in redundant subsystems in some circumstances, and jobs requesting this option normally should be alone in a batch.)

USEP

This message causes the on-line punch and the on-line printer to be assigned the function of system output units. A tape unit would otherwise be assigned this function.

5.3.2 Interrupt Messages

The operator can interrupt the processing of a batch by depressing the request key on the typewriter or the interrupt key on the system control panel. In either case, the monitor causes the ENTER REQUEST message to be typed on the typewriter. The operator must reply to the ENTER REQUEST message with an END, TERM, REST, SKIP, PATC, PRIN, IPL, REIP, TIO, or CONT message or by depressing the ENTER key without typing.

NOTE: END, TERM, REST, IPL, REIP, and SKIP each cause termination of the current job. TERM should be used only when it is suspected that system or program errors may have made NOSS incapable of a normal system dump and that the TERM on-line dump will be useful. END is appropriate when a normal system dump appears useful and possible. (END permits continuation of the batch, but TERM terminates all processing.) REST and SKIP are appropriate when a system dump is not desired (or to terminate a system dump). REST and SKIP also permit the operator to select the next job to be executed. IPL and REIP are appropriate to terminate a batch immediately without a dump.

The messages used following a operator-initiated interrupt are as follows:

*****(Depress ENTER key only)**

The system sets an internal flag to record that exactly this action has occurred and resumes processing at the point of interruption.

Note: Processors such as BATCH, which must respond to operator-initiated communication requests, periodically inspect this flag to determine whether they must read operator messages.

CONT

This message causes the system to resume processing at the point where processing was interrupted.

END

This message causes the current job to be terminated and a dump of main storage to be recorded on SYSOUT together with any other debugging output for the job.

IPL

This message causes the current batch to be terminated followed by a program-initiated re-IPL of NOSS using current configuration (if permitted to SCON) but reading a new set of operator messages (see REIP).

PATC

This message provides for entry of operator messages to be used to change data or instructions in storage, and is used as follows.

a. After the operator has entered PATC, the system types CARD on the console typewriter.

b. The operator types a card image in one of three formats. (In the examples, b stands for space, aaaaaa stands for an absolute address in hexadecimal, and xx stands for data in hexadecimal. Commas and captial letters are required. In all fields, letters may be lower or upper case.)

1. REP image (same format as required by the system loader).

   bREPbbaaaaaabbbbxxxx,xxxx,xxxx

   Note that data is in units of two bytes and that these 2-byte units are separated by commas.

2. PUT image

   bPUTbaaaaaabxxxxxx

   Note that data is in units of a single byte (two hexadecimal digits) and that an odd or even number of bytes is acceptable (1 through 34), but in case of odd numbers of digits, the last digit will be ignored.

3. BEGIN image

   bBEGIN

c. The system checks the card for valid format and, for correct PUT or REP cards, stores the data, again types CARD, and the operator is expected to repeat step 2. For BEGIN cards the system exits from the console interrupt processor to the interrupted program. For invalid cards the system types REPEAT and expects the operator to repeat Step 2.

PRIN

This message provides for operator-requested dumps of portions of storage on the on-line printer.

a. After the operator has entered PRINT, the system types ADR(6), LTH(4) on the console typewriter.

b. The operator types the 6-character hex address of the beginning of the dump area, a comma, a 4-character field specifying the hex length of the dump area, and depresses the ENTER key.

c. The system prints the requested dump on the on-line printer and returns to normal operations.

REIP

This message causes a repeat of IPL in the same manner as the IPL message but, in addition, simulates typing in of the same operator messages as were entered for the previous batch. (It will exactly duplicate IPL if the previous batch used patches to the system (PATC operator message or patch cards via SYSIN) or if the PRIN operator message was used.)

REST or SKIP

Either of these messages causes the current job to be terminated without a dump of main storage being taken. Each also provides for operator selection of the next job to be run as follows.

a. After the operator has entered REST or SKIP, the system types ID on the console typewriter.

b. The operator enters the name of the job with which the system is to resume processing, and then presses the ENTER key. (The name of the job may be obtained from columns 10-15 of the $ID control card provided for the job.) Appropriate action varies for each of four cases.

   1. SYSIN is tape and processing is to continue with the next job. Either REST or SKIP is appropriate. In response to ID, depress ENTER.

   2. SYSIN is tape, and a previous job or the current job is to be restarted. Only REST is appropriate. In response to ID, type the desired job ID. (In the special case where an edit job/batch is to be restarted, specify the previous job and then terminate that job with REST or SKIP with a blank ID.)

   3. SYSIN is tape and the need is to skip to a particular job. Only SKIP is appropriate. In response to ID process as in step b above.

   4. SYSIN is the card reader. Either REST or SKIP is appropriate. If the deck presently in the reader as "next job" is not the next deck to be processed, run out all cards from the reader, arrange decks in the desired sequence with a 7/8EOF card in front of the first deck, and ready the reader. In response to ID, depress the ENTER key.

TERM

This message causes the current batch to be terminated and a dump of main storage to be printed on the on-line printer. After entering this message, the operator must make sure the printer is ready.

TIO

This message is intended for use when NOSS appears to be waiting for completion of an I/O operation but all hardware devices appear idle. The TIO message provides for a programmed check of status of I/O devices plus corrective action where appropriate. The check starts with devices, if any, or channel zero and continues testing all devices on each channel. If it finds all devices good, there is no typeout, or if it has detected a discrepancy, it proceeds as indicated below and provides an explanatory typeout. Possible typeouts are as follows.

UNIT xxx CHAN BUSY

The last attempt to initiate operation on device xxx remains pending, apparently because another device on the channel was busy and has not yet completed its operation. At this time the monitor will make another attempt to initiate operation, in case a device-end interrupt has been lost.

UNIT xxx NOT READY

On the last attempt to initiate operation on device xxx, the device indicated "manual intervention required" and has not since issued a device-end interrupt to declare itself again available. At this time the monitor will make another attempt to initiate operation in case the device has become ready without generating the appropriate device-end interrupt.

UNIT xxx UNIT BUSY

Device xxx is currently processing a request or is waiting to present an interrupt that indicates completion or termination. (Interrupts remain inhibited from the time the monitor honors a 1052 attention request until it completes response to this and any later overlapping attention requests.) The monitor takes no action regarding this operation because, even if the device is failing, there is no effective antidote available.

6.0 CONTROL CARD FORMATS AND INPUT DECK FORMATS

This section describes the formats of the system control cards with which the operator should be familiar and the formats of acceptable input card decks. (A system control card is a control card that provides the system with information needed to process the current batch. All system control cards except the 7/8EOF card begin with a dollar sign in column 1.)

From the operator's viewpoint, there are four types of system control cards. They are batch control cards, job control cards, job type cards, and processor control cards.

Most control cards will not be discussed in detail in this manual; detailed descriptions are available in the Utility System User's Manual. This manual, however, includes all information significant to correct system operation.

6.1 BATCH CARDS

There are four batch control cards. They are the $DATE card, the $END card, the $ENDTAPE card, and the 7/8 EOF card.

6.1.1 $DATE Card

A $DATE card is normally the first card in each batch. It causes the system to assign a date to every job in the relevant batch. This date appears on every page of system processor printer output generated by the jobs in the batch. The format of the $DATE card is as follows.

Column	1
1	6
$DATE	Date

where:

Date is any eight characters, including blanks.

6.1.2 $END Card

A $END card is required. It indicates to NOSS that there are no more jobs belonging to the current batch on the system input device. When the system encounters this control card, it completes processing the current job, types this card, types END OF BATCH and simulates IPL for an expected next batch. The $END card has only the characters $END starting in column 1.

1
$END

6.1.3 $ENDTAPE Card

A $ENDTAPE card is required. It indicates to NOSS that there are no more jobs belonging to the current batch on the system input device and that there are no more batches. When the system encounters this card in normal job processing, it proceeds exactly as for a $END card. The operator is expected to make more jobs available on the system input device before letting the system continue processing. The $ENDTAPE card is significant to the system only when the operator has requested a SKIP to a nonexistent job. In this case, the monitor completes an orderly termination of the batch without attempting to read past the last batch.

The $ENDTAPE card has only the characters $ENDTAPE starting in column 1.

1
$ENDTAPE

6.1.4 7/8EOF Card

A 7/8EOF card is required at the end of each job in a batch except the last or only job to indicate that there are no more source cards for the job. ($ENDTAPE or $END serve the same purpose for the last job). This card contains a 7-punch and an 8-punch in column 1 and the characters EOF in the next three columns. The remaining columns are blank.

6.2 BATCH AND MACHINE RUN DECKS

A machine run deck is a group of batch decks placed sequentially on the system input device. The deck format is best shown by example. Figure 6–1 shows a machine run deck for two batches, a batch of three jobs followed by a single-job batch.

6.3 JOB CARDS

From the operator's viewpoint, there are four kinds of job control cards. There are comment and pause cards, job ID and environment cards, job type cards, and processor control cards.

6.3.1 Comment Card

A comment card contains any information the user wishes to have printed on the system output unit and console typewriter. This information is typed when the card is read during processing of the affected job. Comments may run for several Comment cards. These comments have no effect on system processing of the job. However, their normal purpose is to provide user-communication with the operator. A comment card has a $ symbol in column 1 and a comment beginning in column 16.

Column	1
1	6
$	comment

The comment is any alphanumeric information, including blanks, that does not extend past column 72. If more space is required, additional comment cards can be used.

A comment card may immediately precede any card with a $ in column 1 as long as it does not follow a $UNIT or $REEL card. [The remainder of this manual will ignore the possibility of $ (COMMENT) cards.]

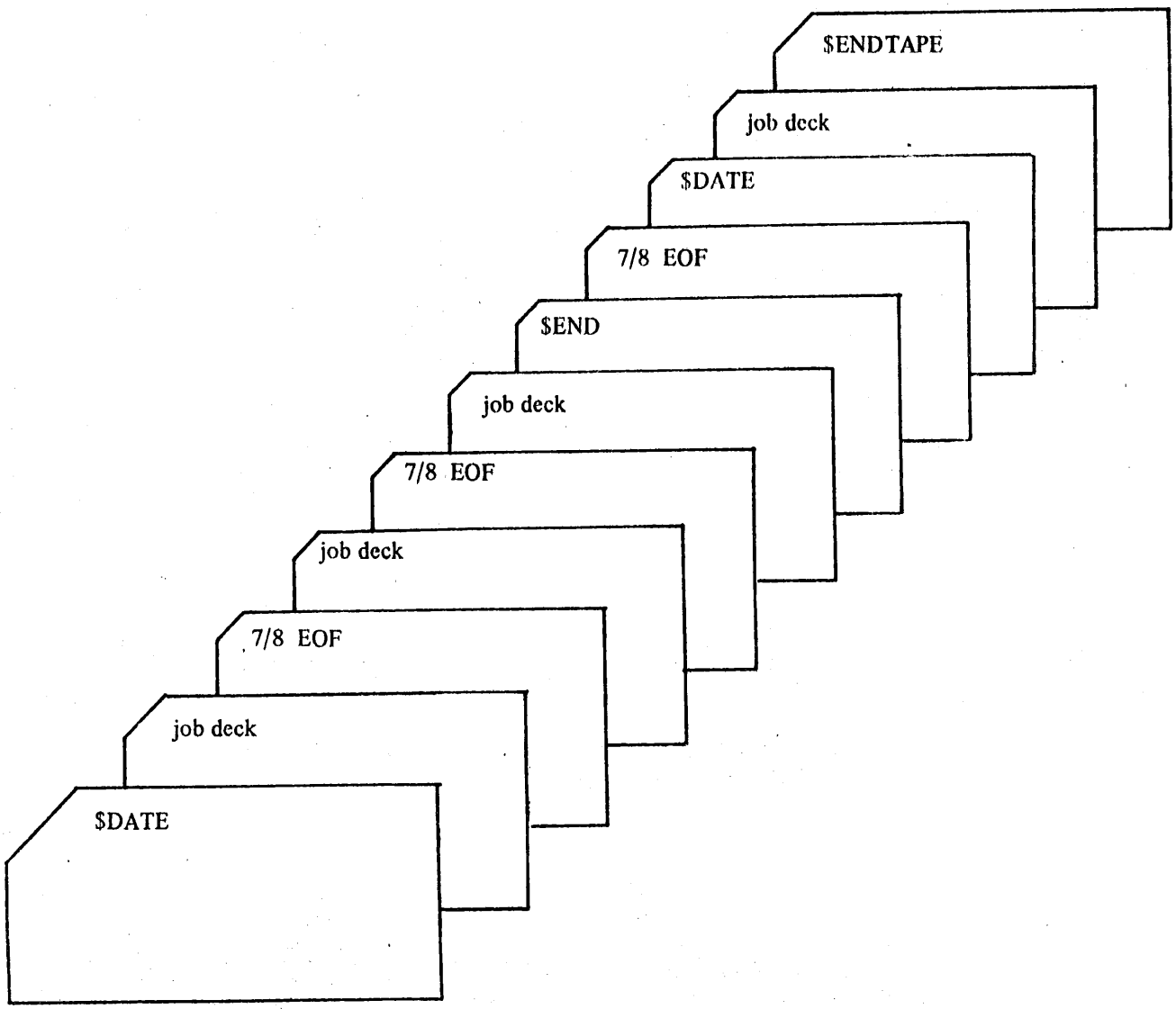

FIGURE 6–1. SAMPLE MACHINE RUN CARD DECK

6.3.2 $PRINT Card

Same format as $(COMMENT) card outlined in subsection 6.3.1. The difference is that the information in column 16–72 is placed on SYSOUT only. $PRINT and $(COMMENT) cards may be in any order.

The format of this card is as follows.

Column	1
1	6
$PRINT	comment

6.3.3 $PAUSE Card

A $PAUSE card causes the NOSS Monitor to reproduce the contents of the card on the system output unit and the typewriter, then wait until the operator depresses the ENTER key on the typewriter. The $PAUSE card allows the programmer to give the operator special instructions and then suspend processing until he has read them and taken appropriate action.

The format of this card is as follows.

Column	1
1	6
$PAUSE	comment

where:

comment is any alphanumeric information, including blanks. This information cannot extend past column 72. If more space is required, this card can be preceded by one or more $ (COMMENT) cards.

A $PAUSE card may immediately precede any card with a $ in column 1 as long as it does not follow a $UNIT or $REEL card. [The remainder of this manual will ignore the possibility of $PAUSE cards.]

6.3.4 $ID Card

The $ID card is required as the first card in each job. It is used to assign a name to each job. The $ID card is punched at the system output punch unit and, together with the system tape label, is listed on the system output print unit and typed on the console typewriter to aid in job identification. If the card is missing, the system considers this a minor error, issues the ID MISSING message, assigns a blank name to the job, and continues processing. If the $ID card is omitted, the operator cannot restart the job. Therefore, every job is required to contain a $ID card.

The format of the $ID card is as follows.

Column	1	1
1	0	6
$ID	ident	comment

where:

ident is the unique name of the job. This name must not be used by any other job in the same machine run.

comment is any additional identifying information and it's optional.

6.3.5 $ENV Card

The $ENV card is optional but, if used, must precede the job type card for the job. The system checks its environment to be sure that all specified conditions are fulfilled and, if necessary, asks the operator to correct discrepancies.

Two examples of the format of the $ENV card (to show all options) are as follows.

Column	**1**
1	**6**
$ENV	**SES=a, SYS=bbbbbb, LIB=cccccc, CMP=ddddddd**
$ENV	**SPT=eeeeee, WK1, WK2, WK3, MOD=SYST, MOD=USER**

where:

SES=a is used to indicate the minimum number of storage elements required to process this job. (The only possible corrective action is to reschedule the job for a time when adequate storage will be available.)

SYS=bbbbbb is used when a specific system tape is required for the job. If the present batch is not using the specified tape, the job will be skipped and must be rerun.

LIB=cccccc is used when a specific library tape is required for the job. If the proper tape is not mounted, the system will request the specified tape to be mounted (by tape label identity, not by tape library slot number). If cccccc is ****** the system will only insist that a library tape be mounted but not check for a specific tape. If cccccc is $$$$$$ the system will assign a library drive (.LIB).

CMP=ddddddd is used when a specific compool is required for the job. If the presently mounted compool tape does not contain the specified compool, the system will request a tape containing the specific compool be mounted (by compool identity, not by compool tape label or tape library slot number). A label of ******** indicates that the system is only to verify that a compool tape is mounted. A label of $$$$$$ indicates that the system must assign a compool drive (.COMP).

CLB=ddddddd is used when a MLC containing a specific compool is required for the job. If the presently mounted MLC tape does not contain the specified compool, the system will request a tape containing the specific compool be mounted (by compool identity, not by MLC tape label or tape library slot number). A label of ******** indicates that the system is only to verify that a MLC tape is mounted.

SPT=eeeeee is used when a specific SPT is required by the job. If the proper tape is not mounted, the system will request the specified tape to be mounted (by tape label, not by tape library slot number). A label of ****** indicates that the system is only to verify that an SPT tape is mounted. A label of $$$$$$ indicates that the system must assign an SPT drive (.SPT1).

WK1, WK2, and/or WK3 are used when these units are essential to the job.

MOD=SYST is used when a problem program requires treatment as a NOSS system processor.

MOD=USER is used when the problem program requires permission to enter supervisor mode and/or perform other operations potentially destructive to NOSS.

If LIB, CMP, SPT, WK1, WK2 or WK3 parameters are used, the NOSS Monitor considers the designated units essential and, if necessary, assigns drives normally assigned to work units (other than any specified as essential) to these functions.

Any combination of parameters may be used in any order except that a CMP or CLB field cannot be followed by any other field. If two or more parameters are used, they must be separated by commas and must not contain any blank characters.

6.4 JOB TYPE CARDS

Job type cards indicate to the monitor the particular type of job being executed.

6.4.1 $NONEX Control Card

This card indicates to the monitor that the job will specify execution of one or more processors but that no object decks need be accumulated on .AUXIL, because the job is not a problem to be executed. This control card is required for all such jobs.

The format of this card is as follows.

Column	1
1	6
$NONEX	NOSPT, NOLIB, NOCOMP

where:

NOSPT is used to indicate that the symbolic program tape is not required by the job.

NOLIB is used to indicate that the library tape is not required by the job.

NOCOMP is used to indicate that the compool tape is not required by the job.

Any combination of these parameters may be used and the parameters may appear in any order. If two or more parameters are used, they must be separated by commas and cannot contain any blank characters.

If one or more of these parameters are used, the tape unit(s) that would have been assigned to the designated tapes are available for other uses for the duration of the job.

6.4.2 $XEQ Control Card

This card indicates to the monitor that the job will specify execution of one or more processors and that object decks must be accumulated on .AUXIL, for loading and execution as a problem program.

The format of this card is as follows.

Column	1
1	6
$XEQ	NOSPT, NOLIB, NOCOMP

where:

NOSPT indicates that the SPT is not required during the job.

NOLIB indicates that the library tape is not required during the job.

NOCOMP indicates that the compool tape is not required during the job.

Any combination of these parameters may be used, and the parameters may appear in any order. If two or more parameters are used, they must be separated by commas and cannot contain any blank characters.

If one or more of these parameters are used, the tape units that would have been assigned to the appropriate tapes are available for other uses for the duration of the job.

6.4.3 $AUX Control Card

This card indicates to the Monitor that the job will specify execution of one or more processors and that object decks must be accumulated on .AUXIL, but not for execution as a problem program.

The format of this card is as follows.

Column	1
1	6
$AUX	NOSPT, NOLIB, NOCOMP

where:

NOSPT indicates that the SPT is not required during the job.

NOLIB indicates that the library tape is not required during the job.

NOCOMP indicates that the compool tape is not required during the job.

Any combination of these parameters may be used, and the parameters may appear in any order. If two or more parameters are used, they must be separated by commas and cannot contain any blank characters.

If one or more of these parameters is used, the tape units that would have been assigned to the appropriate tapes are available for other uses for the duration of the job.

6.5 PROCESSOR CONTROL CARDS

Details of processor control cards are not normally significant to machine room operation. Should a situation occur where details of processor control cards become important, reference to the appropriate User's Manual will be necessary.

The NOSS Monitor places the 9020 in the wait state for certain conditions where it is impractical to indicate the problem by other means. A deliberate setting of wait state is indicated by setting the Instruction Address Register (IAR) to FFFFxx where xx is variable and indicates the specific condition. The IAR values and their meanings are as follows.

FFFF00 Machine check during IPL sequence. (Logout editing is not attempted until the NOSS Monitor has been initialized.)

FFFF01 The system tape provides for reading patch cards from an on-line reader at the beginning of the IPL sequence. It was unable to read probably because a patch card was defective or because there was no bBEGIN card following the last patch card.

FFFF03 SCON (Set configuration) failed during IPL. If the reason for failure was a hardware error, it should be reported to the maintenance personnel. If the reason was that the NOSS Monitor attempted to configure unavailable units, take the following action.

a. Place a complete selection mask in storage at hexadecimal address 80 as follows.

Selection Mask

xxx	x	xx	00	xxxx	xxxx	xxxx	xxxx	0000	0	xxx
123	1	23		1234	5678	9ABC	1234			123
PAM	TCU					SE		CE		IOCE

NOTE: The IPL TCU, SE, CE, and IOCE must be included. Any other available unit should be included.

b. Place a complete configuration mask in storage at hexadecimal address 84 as follows.

Configuration Mask

xx	xx	xx	x	0	xxxx	xxxx	xxxx	xxx0	0000	0xxx
State	12 SCON	34 LOS	I		Set same bits as for Select Mask					

NOTE: State is normally 00, SCON field should be identical to CE select field, ILOS bit is normally 0, and remainder of work normally exactly matches corresponding portion of the select mask. Exceptions are possible but are beyond the scope of this manual.

c. Depress the console INTERRUPT and START keys.

FFFF05 SATR (Set Address Translator) failed during IPL.

FFFF09 Unit assignment failed during IPL. (If sufficient hardware is available for the basic units, .AUXIL, SYSIN, SYSOUT, and .TYPE, this is a system failure. A major possibility of the

cause is the availability of too many units causing a monitor table overflow. No more than 1 IOCE and 20 I/O units other than 1052 should be configured. If this appears to be the problem, the extra units should be configured away and the IPL repeated. If this does not help or does not seem to be the problem, the problem should be reported.)

FFFF0A Unit assignment failure. Take same action as for FFFF09.

FFFF0B Unit assignment could not find available 1052. Make sure console typewriter is available and repeat the IPL. General purpose register 2 set as follows.

GPR2 = 0 all 1052s reported not operational to TIO.

GPR2 = 0 contains unit address of 1052 which reported busy or CSW stored to TIO.

FFFF0C Unit assignment failure on an edit job. Take same action as for FFFF09.

FFFFD0 An SE logout stop or IOCE PSA Lockout interrupt occurred. This can be either a system or machine error. This should be reported to maintenance personnel since, even if the problem is not in the hardware, their assistance may be necessary in taking a storage dump.

FFFFE0 A NOSS processor requested this wait due to program, system or machine problems. If requested by the user, take an emergency dump of storage via Program Status Word (PSW) restart or card-loaded dump program.

FFFFE1 Programmed IPL for next batch failed. (The NOSS Monitor attempts to initialize itself for each successive batch by reading from the system tape.) Execute the IPL sequence manually as for an initial batch.

FFFFE2 The emergency on-line storage dump routine has finished its printout.

FFFFE3 The emergency on-line storage dump routine could not find a printer. Make sure an on-line printer is available, set General Register 4 to its address, and depress the console START and INTERRUPT keys.

FFFFE4 Operator has detached one of the basic units (.SYSTM, SYSIN, SYSOUT, .AUXIL, or .TYPE), and processing cannot continue without manual IPL.

FFFFE5 An IOCE processor can not be turned off at end-of-job. The system should be re-IPLed through the hardware and the next job run. The problem should be reported.

FFFFF0 Edited logout routine, called because of apparent or actual hardware error, has completed its printout.

FFFFFA Machine check during edited logout. A complete edited logout of either the original failure or this second failure is now impossible, and analysis will have to proceed without it.

FFFFFB The machine error logout routine was entered twice. An edited logout of the original failure is now impossible, and analysis will have to proceed without it.

FFFFFC An external interrupt occurred during the execution of the machine error logout routine. Response is the same as for FFFFFB.

FFFFFD The machine error logout routine is unable to read its analysis and print routines from tape. Response is same as for FFFFFB.

This is programmed hard stop for machine check interrupt on standard System 360 or stand-alone Input/Output Control Element Processor (IOCEP) batching system.

FFFFFE Program error during execution of the machine error logout routine. A core dump should be taken and sent to the proper program maintainer.

FFFFFF An I/O interrupt occurred during the execution of the machine error logout routine. Response is the same as for FFFFFB.

8.1 INTRODUCTION

The BATCH routine is a monitor facility which allows for several off-line operations to be handled simultaneously in a small machine configuration. Three simultaneous operations among the following operations requiring print/punch groups is the maximum that can be performed.

a. Create a utility system format SYSIN tape with either cards, or cards and an SPT tape as input.

b. Create an unblocked card image tape.

c. Print tapes in SYSOUT, SYSIN, unblocked print record, hexadecimal dump, or alphabetic dump format.

d. Log any tape.

e. Punch a SYSIN tape, an AUXIL tape, a hexadecimal tape, or an unblocked card image tape.

f. Write end-of-file tapemarks on a tape.

Other off-line operations performed by BATCH, but which lock out all other operations are as follows.

a. Create an MLC tape.

b. Duplicate one tape onto another one.

c. Compare two tapes in SYSOUT, SYSIN, SPT, or hexadecimal tape format.

d. Generate a 7-track SYSOUT tape from a 9-track SYSOUT tape.

If a hard copy of a deck which is resident only on tape is wanted, then the punching of a .SYSIN or .AUXIL tape can be very useful.

The duplication of tape from 9-track to 7-track or just a straight duplication can be used for tape backup, or to make use of the 1401, or 7-track drives on the 9020.

Except for the generated SYSIN tape, which is always written on .AUXIL, all tape assignments are made by operator messages assigning specific drives to specific functions. Every tape drive listed in the IPL time MOUNT message, and normally any other attached tape, is available for any BATCH function (except as noted under individual functions).

Control of BATCH is via typewriter input messages. These must be entered in response to one of the three following control messages.

1. INITIALIZE BATCH – The processor has just been loaded via the IPL message BATCH.

2. GO! – BATCH awaits a new set of control messages in response to the typewriter sequence: depress REQUEST key, wait for ENTER REQUEST, depress ENTER key.

3. TRY AGAIN STARTING WITH xxxxx———BATCH rejected the first message indicated (xxxxx) but has not yet decoded any following submessages. All of these remain in the message area, and what is typed at this time will replace a corresponding portion of the original messages. It

is not necessary to retype the entire original message; change only the portion that was incorrect. (If new submessages are shorter, blanks may be left at the end of any submessage. However, if they are longer the entire remainder of the message must be retyped.)

8.2 CREATE SYSIN TAPES

To initiate SYSIN tape generation, stack job decks in the reader and type in CTT. For an unblocked card image SYSIN tape, stack job decks in the reader and type CTT/N. In final job processing SYSIN will be on tape. Use $ENDTAPE instead of $END to terminate the last batch to be loaded on any SYSIN reel. (Decks for more than one reel may be stacked.)

BATCH scans all cards written on the generated SYSIN and types a summary consisting of significant portions of each $ID, $UNIT, $REEL, and $ENV control card.

BATCH enables the programmer to submit any assortment of decks (or selected portions of those decks) prestored on one or more SPTs with insert, delete, merge, or replace cards on SYSIN. To use this service, proceed as follows.

a. Place selected card decks on an SPT tape. BATCH imposes only two restrictions.

   1. The tape label must be unique.

   2. Each card image on the SPT tape is assumed to contain an 8-character sequence number in columns 73–80, and cards in each file must be in order if updates are to be used.

   Assuming that the submitted decks are acceptable to SPTEDT, BATCH may process any of these decks.

b. Assign a unit(s) for the SPT(s). To assign a drive for SPT, enter the message SPTnnn. More than one drive may be assigned by typing in several SPT messages with different unit numbers. The units will be used in the order assigned as requests for new tapes are processed.

c. Prepare job deck. To control merging of cards from SPT tapes, include $SPT control cards in the following formats as appropriate.

Column	1	1
1	0	6
$SPT	zzzzz	xxxxxx
$SPT	zzzzz	xxxxxx,yyyyyyyy
$SPT	zzzzz	******,yyyyyyyy
$SPT	zzzzz	

where:

xxxxxx is SPT tape label from the $SPTEDT card.

yyyyyyyy is SPT file name from the APROG card.

zzzzzz is an optional SYSIN resequencing specification. The field may be blank, or may contain RESEQ, NORES, or ABSNR.

The first format, specifying only a tape label, serves to select the specified tape (normally for a subsequent $SPT card specifying file name but not tape label). It is considered a $ control card, and serves no other purpose. It may appear any place in a job deck prior to other $SPT control cards for the same tape.

The second format, specifying tape label and file name, serves to select the specified tape and initiate processing of the named file. It is selfsufficient and does not require a preceding $SPT tape select card.

The third format, containing ****** in the tape select field, serves to initiate processing of the named file of the currently selected tape. If one or more $SPT cards of this format are used, they must be preceded by a $SPT card specifying tape label.

The fourth format is used where a $ control card is required only to satisfy the BATCH rule that processing of an SPT file may be terminated only by a $ control card or 7/8EOF card.

Follow the $SPT file select card (second or third format) with INS/FINIS, DEL, merge, and replace cards in the same manner as for an SPT update (except that BATCH will accept any valid sequence number without demanding an identical number from tape for INS and DEL cards). Terminate processing the file with whatever $ control card is appropriate. (Note that the last form of $SPT card is provided for the special case where no $ control card is desired in the generated SYSIN deck and no other $SPT card is appropriate. Also note that, for the corresponding case where a $ control card is to be inserted without terminating file processing, the user must place his card (with other cards as appropriate) between INS and FINIS cards and place a pseudo-sequence number of $$$$$$$$ on the $ control card.)

For card to tape errors using an SPT tape, some of the messages produced are as follows.

$SPT**FILExxxxxxyyyyyyy: DELaaaaaaaa,bbbbbbbbAFTERcccccccc**

$SPT**FILExxxxxxyyyyyyy: INS aaaaaaaaAFTERcccccccc**

$SPT**FILExxxxxxyyyyyyy: MERGE/REPLACEbbbbbbbbAFTERcccccccc**

$SPT**FILExxxxxxyyyyyyy: SPT CARD HAS AN ERROR**

$SPT**FILExxxxxxyyyyyyy: NO FINIS FOR INSaaaaaa**

$SPT**FILExxxxxxyyyyyyy: RESEQUENCED SPT NUMBERS OVER 99999000**

$SPT**FILExxxxxxyyyyyyy: NO SPT FILE FOUND, REG IGNORED**

MOUNT SPT –xxxxxx– ON DRIVE yyy (not aaa bbbbbb)

For all but the last error message, looking at the deck should be enough to find the problem. The last error message indicated either the wrong tape was mounted or the wrong tape was requested on the instructions to the operator.

The sample job deck (Figure 8–1) references three files on two SPT tapes. The first reference is to a JOVIAL source deck on tape JD0419. A START card was inserted before the $SPT card, presumably because there was no START card in the SPT file.

The second reference is to an object deck on tape JD0422. The DEL card is probably meaningless since card number 99999999 does not normally exist.

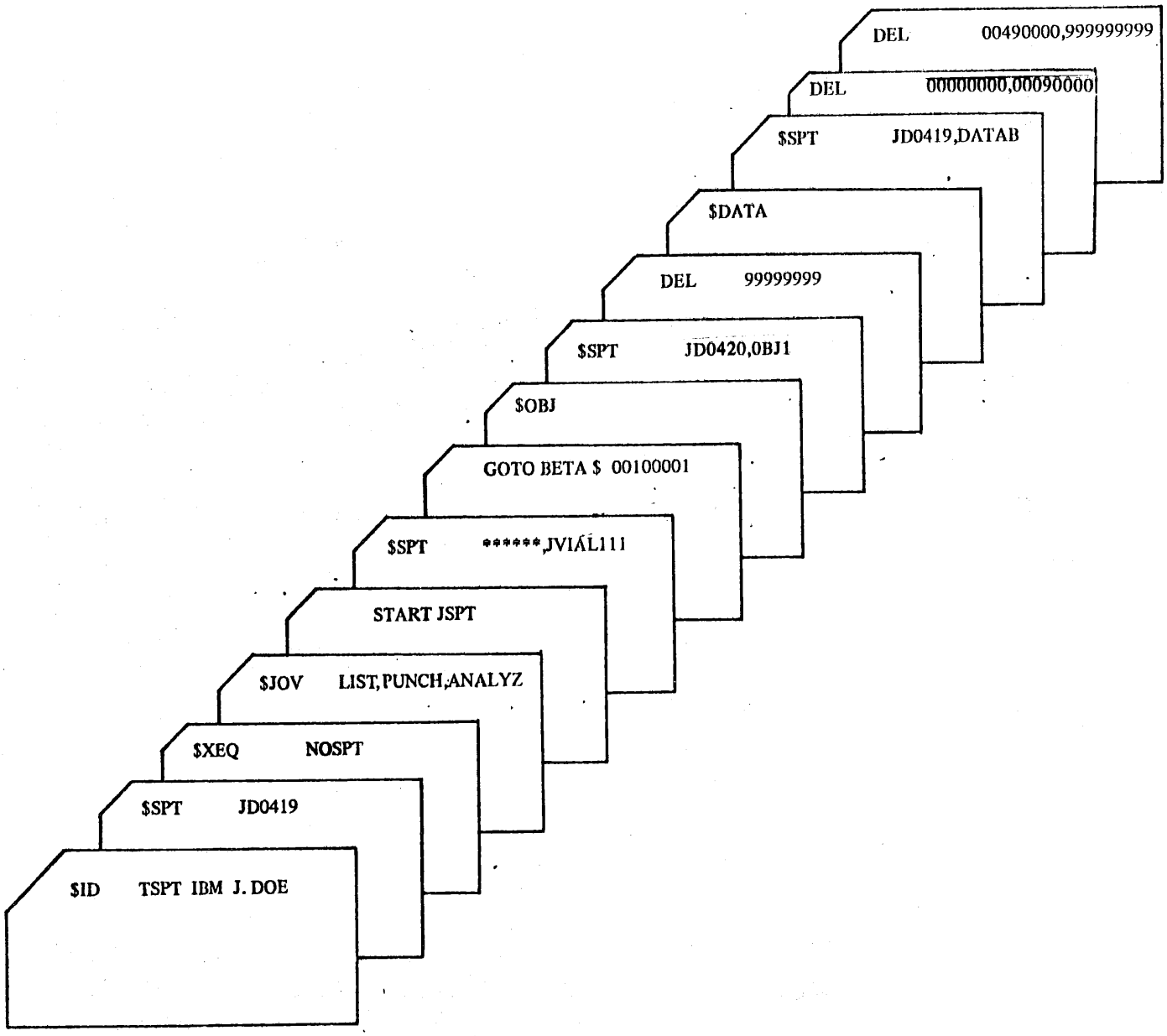

FIGURE 8–1. SAMPLE JOB DECK

The third reference is to a data deck, again on tape JD0419. The control cards delete all except cards 00091000 through 00489000.

8.2.1 SYSIN Creation Using Conditional Copy

This facility is an extension of the basic SYSIN creation outlined in the preceding paragraphs. This capability provides a method for conditionally extracting data from an SPT file. The burden of duplicate maintenance is eased when all source data relating to a particular program reside on one SPT file. The differentiation between code applicable to versions of the same program will be accomplished by the use of control statements recognized only by BATCH. These control statements may exist either as card input or may actually reside on the SPT file itself. A user-invoked SPT option specifying the version(s) of code desired from the SPT file will permit the extraction of data from the tape.

This BATCH facility will permit, for example, a 3d1.0 version of a given program to be produced from a combined 3c/3d source SPT file by extracting as output (SYSIN) only the code that applies to the 3d version. Thus, code common to both versions appears only once in an SPT file.

BATCH will now recognize two new $SPT cards (MATCH and MATCX) as well as a new file alternation card (ALLOW).

The new $SPT cards have the following form.

```
1       10      16
$SPT    MATCH   AA, BB, ....
$SPT    MATCX   AA, BB, ....
```

From 0 to 5 positional 2-byte parameters beginning in column 16 on the MATCH or MATCX card will be permitted by BATCH.

The new file alteration card has the following form.

```
10      16
ALLOW   AA, BB, .....
```

From 0 to 19 positional 2-byte parameters beginning in column 16 on the allow card will be permitted by BATCH.

The following rules will apply to the MATCH or MATCX option.

a. If no MATCH or MATCX option is detected, BATCH will operate exactly as it does now (i.e., all data on SPT transferred to SYSIN including ALLOW cards, if present).

b. An encountered MATCH or MATCX option will remain in effect until overridden by another MATCH or MATCX option or by a $ID card.

c. A MATCH or MATCX option without parameters (blanks in columns 16–29), accept as eligible all source.

d. A MATCH or MATCX option will accept as eligible all source encountered prior to the first ALLOW card, per SPT file.

The following rules apply to the ALLOW File Alteration card.

a. ALLOW cards will be stripped from output (SYSIN) if a MATCH option is in effect; however, all ALLOW cards will be transferred to SYSIN if a MATCX option is in effect.

b. ALLOW arguments apply to all source following until another ALLOW card is encountered, per SPT file.

c. ALLOW cards with no arguments (blanks in columns 16–71) indicate that source following will always be included in output (SYSIN).

Following are examples of job setup and expected results.

Example 1

SPT Contents:

```
FILE 4          APROG                   FILE 4      00001000
                ALLOW   4A                          00002000
XFILE 4         START   0                           00003000
                ALLOW   4B                          00004000
XFILE 4         START   X'100'                      00005000
                ALLOW   4C                          00006000
XFILE 4         START   X'200'                      00007000
                ALLOW                               00008000
* CARD 100 OF FILE 4                                00009000
* CARD 200 OF FILE 4                                00010000
* CARD 300 OF FILE 4                                00011000
* CARD 400 OF FILE 4                                00012000
* CARD 500 OF FILE 4                                00013000
* CARD 600 OF FILE 4                                00014000
* CARD 700 OF FILE 4                                00015000
* CARD 800 OF FILE 4                                00016000
* CARD 900 OF FILE 4                                00017000
                END     XFILE 4                     00018000
```

Control Card Input:

```
Column      1           10          16
-------------------------------------------------------
            $ID         NAME
            $BAL                    LIST, ANALYZ
            $SPT        MATCH       4B
            $SPT                    SPT002, FILE 4
```

Assembler Output:

```
ADDR1   ADDR2    LINE  SYMBOL  OP      OPERAND–COMMENTS        IDENT

000100           00001 *       FILE 4  START X'100'            00005000
                 00002 *       CARD 100 OF FILE 4              00009000
                 00003 *       CARD 200 OF FILE 4              00010000
                 00004 *       CARD 300 OF FILE 4              00011000
                 00005 *       CARD 400 OF FILE 4              00012000
                 00006 *       CARD 500 OF FILE 4              00013000
                 00007 *       CARD 600 OF FILE 4              00014000
                 00008 *       CARD 700 OF FILE 4              00015000
                 00009 *       CARD 800 OF FILE 4              00016000
                 00010 *       CARD 900 OF FILE 4              00017000
000100           00011         END     XFILE 4                 00018000
```

In Example 1 the proper START card was selected by using the MATCH "4B" control card. The "ALLOW blank" card was used to include all source from that point to the end of file (or next ALLOW control card).

Example 2

SPT Contents:

```
FILE 2          APROG                   FILE 2      00001000
XFILE 2         START   0                           00002000
* CARD  100  OF  FILE  2                            00003000
* CARD  200  OF  FILE  2                            00004000
* CARD  300  OF  FILE  2                            00005000
                ALLOW   2A                          00006000
* CARD  400  OF  FILE  2                            00007000
                ALLOW   2B                          00008000
* CARD  500  OF  FILE  2                            00009000
                ALLOW   2C                          00010000
* CARD  600  OF  FILE  2                            00011000
                ALLOW   2D,2A                       00012000
* CARD  700  OF  FILE  2                            00013000
                ALLOW   2B,2C                       00014000
* CARD  800  OF  FILE  2                            00015000
* CARD  900  OF  FILE  2                            00016000
                END     XFILE 2                     00017000
```

Control Card Input:

```
Column   1          10          16                  73
---------------------------------------------------------
         $ID        NAME
         $BAL                   LIST,ANALYZ
         $SPT       MATCH       2A,2C
         $SPT                   SPT002,FILE 2
                    ALLOW       2E                  00003500
                    ALLOW       2D                  00006000
                    ALLOW       2A                  00008000
```

Assembler Output:

```
ADDR1    ADDR2      LINE  SYMBOL   OP      OPERAND--COMMENTS      IDENT
000000              00001  XFILE 2  START   0                      00002000
                    00002  * CARD  100  OF  FILE  2               00003000
                    00003  * CARD  500  OF  FILE  2               00009000
                    00004  * CARD  600  OF  FILE  2               00011000
                    00005  * CARD  700  OF  FILE  2               00013000
                    00006  * CARD  800  OF  FILE  2               00015000
                    00007  * CARD  900  OF  FILE  2               00016000
000000              00008           END     XFILE 2                00017000
```

In Example 2 the ALLOW cards were manipulated via the input control card stream.

NOTE:

1. In both examples the special $SPT match card precedes the normal $SPT card. If the order is reversed, the BATCH function will be turned off upon detecting the dollar sign on the special match card.

2. Once invoked, MATCH or MATCX remains in effect for the entire job. Thus, if regular "no MATCH or no MATCX" steps and MATCH or MATCX jobsteps are mixed within a job, the "no MATCH or no MATCX" steps must come first.

8.3 TAPE TO PRINT/PUNCH

The tape to print/punch capability of BATCH allows for either printing, punching, or printing and punching a NOSS Monitor-generated SYSOUT. Other tapes can be printed in special formats as noted in the possible suffixes to the initiation message.

To initiate tape-to-print/punch operation, mount a tape to be processed on an available drive (7- or 9-track as appropriate excluding SYSOUT) and enter one or more of the following messages as appropriate, starting with a TTP message to select the processing mode and associate a tape drive with the print/punch group.

TTPp nnnaa(,dddd,mmmm)

Start to process the tape on drive nnn using print/punch group p. Options assumed are to start from present position and to print and punch to end-of-file. Mode of processing is controlled by field aa as follows.

(Field missing or other than /S, /N, /X, or /A) tape is assumed to be utility system SYSOUT format and will be processed according to carriage control fields in the tape records.

/S – tape is assumed to be utility system SYSIN format and will be printed single-spaced.

/N – tape is assumed to contain unblocked print images, which will be printed single-spaced.

/X – tape is assumed to be unformatted and will be printed in hexadecimal (hex/dump).

/A – tape is assumed to be unformatted and will be printed in alphanumeric characters (alpha/dump).

The part of the message (,dddd,mmmm) is density and mode for 7-track tapes other than SYSOUT. The SYSOUT is assumed as density 556, odd parity, no byte converter. If these fields are not present, density 800, odd parity is assumed. The possible values for ddd can be D200, D556, D800. The values for mmmm can be:

BIN – The tape was written using a byte converter (NOSS system tape, library, compool, SPT, or SYSIN).

EVEN – The tape was written with even parity.

EVENT – The tape was written with even parity in Binary Coded Decimal (BCD).

ODD – The tape was written with odd parity.

ODDT – The tape was written with odd parity in BCD.

Some of the other options associated with tape to print/punch are as follows.

a. **ALLp**

Continue processing to end-of-tape. (This message must follow any from step d which are used if it it is to be honored.)

b. **STPp**

Stop processing with print/punch group p.

c. **NPRp NPUp PRTp PUNp**

Only the most recent of these messages is applicable to group p. NPR means no print but punch. NPU means no punch but print. PRT and PUN each mean both print and punch.

d. **BSRp ccccc**

Backspace record (about five lines per record). The printer/punch group associated with the tape to be positioned is p. The number of times the operation is to be executed is designated by ccccc, a decimal number of one or more digits (separated from p by one space).

e. **BSFp ccccc**

Backspace file – see BSR.

f. **FSFp ccccc**

Forward space file – See BSR.

g. **FSRp ccccc**

Forward space record – See BSR.

h. **RWDp**

Rewind.

i. **RUNp**

Rewind and unload.

j. **TRNp n**

Translate the tape being processed according to the requested Extended Binary-Coded Decimal Interchange Code (EBCDIC) character translation. The print/punch group associated with the tape to have special translation is p. The translation table wanted is designated by n, a decimal number from 0 to 2 (separated from p by one space). The possible values are as follows.

1. 0 – Printed as if online (includes sense and retries).

2. 1 – Use 48-character set translation table.

3. 2 – Use the complete character set as found on the PL1 print chain. Includes both (%,(;#,=;+,&; etc.) NOTE: This is assumed if TRN is not typed in.

BATCH types each $ID card processed and types EOF for each end-of-file and end-of-tape when completing an ALL request.

NOTE: The console typewriter should be monitored for any of the following messages. The message implies incorrect tape format (unlikely with NOSS SYSOUT tapes), wrong tape mounted, possible hardware error (if associated with SENSE-RETRY messages), or the operation needs access to another SE.

BATCH prints the following messages on the printer involved as appropriate.

**********BAD PRINT/PUNCH TAPE FORMAT**********

************OVERLENGTH PRINT RECORD************

*************OVERLENGTH TAPE RECORD************

Tape format does not conform to specifications for NOSS SYSOUT or SYSIN tapes (as appropriate), or for processing the tape with the second SE unavailable and record size exceeding buffer size.

The most common causes are as follows.

a. Incorrect tape mounted; mount a SYSOUT (or SYSIN) tape.

b. The SYSOUT tape was not rewound before being written by NOSS; space forward one or more files until valid data appear.

c. Operator generating SYSOUT did not allow NOSS to cycle through end-of-batch before unloading the SYSOUT tape. Consider tape completely printed.

Other possible causes are user-error such as an incorrect call to NOSS print routines or incorrect format on a tape not written by NOSS but supposedly conforming to NOSS rules.

8.4 TAPE LOG

Tape logging can be used to determine the number and size of records and files on a tape. The input message for tape log is in the format:

TLGp XXX(,dddd,mmmm)

where:

p is the number of the printer.

XXX is the physical address of the tape.

dddd is the optional density for 7-track tapes only (not required if density is 800 unless mmmm field is used). Possible values are:

D200
D556
D800

mmmm is the optional mode for 7-track tape only (not required if ODD parity is desired). Possible values are:

BIN – The tape was written using a byte converter. (Examples are NOSS system, library, compool, SPT, or SYSIN tapes.)

EVEN – The tape was written with even parity.

EVENT – The tape was written with even parity in BCD.

ODD – The tape was written with odd parity.

ODDT – The tape was written with odd parity in BCD.

For a 7-track tape with no dinsity, or mode specified density 800 bits per inch; ODD parity is assumed.

The printer output is in the following form.

FILE XXXXX; RECORD NUMBER XXXXX; NUMBER OF BYTES (16) XXXXXX; NUMBER OF BYTES (10) XXXXX; NUMBER OF WORDS (10) XXXXX

For the first record of each file a hexadecimal and an alphabetic dump of up to 256 bytes is taken.

All of the options for tape to print/punch except (d) are valid for tape log and have the same meaning they do for tape to print/punch.

8.5 TAPE PUNCHING

Several special types of data on tape may be wanted on cards. This capability produces a punched deck from a SYSIN, .AUXIL, or any other tape. The message is in the following format.

TPNp XXX(/c)(,dddd,mmmm)

where:

p is the number of the print group for the punch.

XXX is the physical address of the tape.

/c is for a special tape. This can have the values:

/T – punching an .AUXIL tape. The tape will be punched on loader format text cards.

/S – punching a SYSIN. The cards will be punched out as read in. They will also be listed unless NPRp is specified.

BLANK – the tape will be punched on loader format cards with one deck per tape file.

/n – punching an unblocked tape. The cards will be punched out as read in.

dddd,mmmm refer to tape logging.

An .AUXIL tape is only one file; so, the end-of-file is assumed as the end-of-tape.

All of the tape to print/punch options are valid for tape punching except (d).

NPRp is valid for punching a SYSIN; and it means to punch, but not print.

8.6 TAPE DUPLICATION

BATCH can duplicate any tape written according to the following rules.

a. Records may not be less than 16 bytes or more than 65,535 bytes long. (All records written under control of the NOSS Monitor conform to this rule.)

b. A tape may contain any number of files but must have two consecutive tapemarks recorded to indicate end-of-tape. (NOSS system, library, compool, SPT, SYSIN, and SYSOUT tapes follow this rule.)

To duplicate a tape, mount it on any drive (except SYSOUT, which cannot be read). Mount a scratch tape on another drive (except SYSOUT, which cannot be read for checking). Be sure at least two SEs are available. Type the following messages as instructions to BATCH.

DUPxxx,yyy
or
DUPxxx,yyy,ddd
or
DUPxxx,yyy,dddd,mmmm

where:

xxx is physical address of tape to be copied.

yyy is physical address of the tape or tapes to be written on. If more than one tape is to be generated, use the form yy1/yy2/yy3/etc. (For most efficient operation select a different channel for each consecutive unit specified.)

ddd ,is density for any 7-track tapes involved (not required if density is 800 unless mmmm field is used.) Possible values are:

D200
D556
D800

mmmm is mode of reading or writing on any 7-track tapes involved. Possible values are:

Field omitted – suitable for almost all 7-track to 7-track duplication. This causes ODD parity. (Exceptions are even parity tapes and tapes with records longer than 65,535 6-bit bytes. A typeout appears if this problem exists.)

BIN – required for duplicating between 9-track and 7-track when byte converter use is required. (Examples are NOSS system, library, compool, SPT, or SYSIN tapes.)

NOTE: NOSS SYSOUT tapes should never be duplicated to a different track format.

EVEN – required if 7-track tapes involved are even parity.

EVENT – required if 7-track tapes involved are BCD with even parity.

ODD – optional if 7-track tapes are odd parity. ODD is assumed unless designated otherwise.

ODDT – Required if 7-track tapes involved are BCD with odd parity.

BATCH duplicates records and tapemarks to and including the double tapemark at end of tape, rewinds and unloads unit xxx and types the following messages:

FILE COUNT fff, RECORD COUNTxxxxx

FILE COUNT fff, RECORD COUNT xxxxx, ***WARNING* yy**

RECORDS MORE THEN 65534 BYTES LONG

where:

ff is number of files copied.

xxxxx is number of records copied.

yy if present, is warning of possible failure. If copying from 7-track tape without specifying mode, and tape was originally written using byte converter (BIN), repeat specifying BIN Mode. Otherwise, assume duplication failed unless the tape is known to contain yy records each exactly 65,535 bytes long. Then, BATCH proceeds in one of the following ways.

a. More tapes are to be recorded. Reassign the yyy (written just previously) as xxx and repeat the duplication.

b. The last tape has been recorded. Reassign yyy as xxx for a read only pass to validate the last tape recorded.

c. The read only pass is complete. Process the next operator request.

A special case of tape duplication is conversion of a 7-track SYSOUT tape from a 9-track SYSOUT tape. A straight duplication from the 9-track to 7-track will not produce the desired results, so the following message is used.

SYSxxx,yyy

where:

xxx is the physical unit number of the 9-track SYSOUT tape to be converted.

yyy is the physical unit number of the 7-track tape on which the converted SYSOUT data is to be written.

All of the normal duplication restrictions hold.

When the SYSOUT conversion is completed, the following message is typed and the tapes are unloaded.

END SYSOUT CONVERT

8.7 MERGED LIBRARY/COMPOOL (MLC) CREATION

To reduce the number of tape drives required for JOVIAL compilation, library and compool data may be merged onto a single MLC tape.

BATCH can merge library data from a library or MLC tape with compool data from a compool or MLC tape to create an MLC tape. Merged Library/Compool tapes can then be mounted on LIB1 for use by the JOVIAL compiler when there are insufficient tape drives to permit assignment of a separate .COMP drive.

Proceed exactly as for DUP, except that the control message format is as follows.

MLCxxl,xxc,yyy

where:

xxl is the physical address of the tape with library data.

xxc is the physical address of the tape with compool data.

yyy is the physical address of the tape or tapes to be written in the same manner as for DUP.

8.8 TAPE COMPARISON

The tape compare capability of BATCH can be used to determine the differences or lack of differences between two tapes. There are several limitations, restrictions, or special conditions for tape compare. They are as follows.

a. There must be at least two SEs. For hexadecimal compares, tape reading will be unbuffered when two SEs are available, and buffered when three or more SEs are available.

b. For a compare of SYSOUT tapes, the tapes must be either both 9-track tapes or both 7-track tapes.

c. The compare is terminated by the end of one tape or by accumulating a number of errors which exceeds 50 + 0.1 x number of records processed.

d. The file will be read out and compare suspended for 20 errors in a file.

e. When one tape reaches end of file, the other will be read and printed out until it also reaches end-of-file.

f. For end-of-tape on one tape, the other tape will be read to end-of-file to complete the compare.

g. For SYSOUT tapes, the first header on each page and all punched cards are ignored for the compare.

h. For SPT tapes, the header record is ignored and comparison starts with file 2.

i. All EBCDIC tape compares will attempt to find a match for records which do not match. Both tapes are searched 25 logical records down the tape before a compare error is declared.

j. For comparison of SYSIN or SPT tapes, the last eight card columns (73–80) are ignored.

The input message for the first tape is as follows.

CMPpXXX(/c)(,dddd,mmmm)

where:

p is the number of the printer.

XXX is the physical address of the tape.

/c is for a special tape. The possible values are:

/p – two SPT tapes to be compared.

/y – two SYSOUT tapes to be compared.

/s – two SYSIN tapes to be compared.

BLANK – any two tapes to be compared.

dddd,mmmm refer to tape logging.

The message for the second tape is as follows.

CMPX XXX(,dddd,mmmm)

where:

XXX is the physical address of the tape.

dddd,mmmm refers to tape logging.

Comparison may be desired when starting with other than the first file. The message for positioning a tape to be compared at other than the load point is one of the following.

POSp fff,rrrr
or
POSp ,rrrr
or
POSp fff,

where:

p is the printer as assigned by CMPp, or an X if CMPX is to be spaced.

fff is the file at which the compare is to start (zero, or 1 if the first file).

rrrr is the record within the file where the compare is to start (zero, blank, or 1 if the first record).

The output will be found on both the printer and the typewriter. For two tapes which compare exactly, the message **NO DISCREPANCIES is typed out.

The possible typewriter messages before the compare starts are as follows.

a. ****NOT ENOUGH INPUT FOR COMPARE ENTER REQUEST AGAIN –**

Both units for the compare were not defined. Type the one needed and depress the ENTER key.

b. **CMPp ILLEGAL POSITION REQUEST –**

An end-of-file was encountered while trying to position to the requested record. Type the correct position request and depress the ENTER key.

c. ******CMPp BAD TAPE FORMAT. TYPE SKIP TO END COMPARE –**

The tape mounted on the specified unit is not in the format the compare message indicates. If the wrong tape is mounted, mount the correct tape and enter. Type in "SKIP" to end the compare at this point.

The printer messages are as follows.

a. *****FILE 123; RECORD 12345; TAPE CMPp –**

This is the position of the specified tape when the error was detected.

b. **LENGTH CMPn = yyyyy CMPX = yyyyy**

This message follows (a) in a hexadecimal tape compare when the non-compare was caused by record length. n represents the print group which is the destination of the output and yyyyy represents the place taken by the physical lengths of the two records.

c. *****MATCH FOUND THROUGH TAPE POSITIONING –**

This message follows (a) when a match has been found for an EBCDIC compare. The position message will follow this. This will then be followed by a printout of all records up to the one which matched.

d. ****SKIPPED TO NEXT FILE, 20 ERRORS THIS FILE –**

The 20th error in a file has just been printed out. The tapes are spaced to the next file and processing continues.

e. ****THERE WERE 10 MISMATCHED RECORDS**

This is the summary message which is printed and typed at the end of the compare.

In addition to the above messages up to 256 bytes in a hexadecimal tape compare or the logical record in an EBCDIC compare are printed.

The "ALLp" and "TRNp n" messages have the same meaning for tape compare that they do for tape to print/punch.

When the compare is completed by either end of file (if "ALLp" was not typed,) or end of tape (if "ALLp" was typed), the tapes that were compared are unloaded.

8.9 WRITE END-OF-FILE TAPEMARKS ON TAPE

BATCH writes end-of-file tapemarks on any tape. To accomplish this, mount the tape on any drive except SYSOUT. Type the following message as instructions to BATCH.

WTMxxx/n

where:

xxx is the physical address of the tape to be written.

/n is optional and, when included, designates the number of tapemarks to be written. One tapemark is written when /n is not included; n tapemarks are written when /n is included.

9.0 OPERATOR AIDS

The following actions taken by NOSS should be remembered.

a. If SYSIN is tape, the NOSS Monitor will never rewind it. Therefore, after executing end-of-batch and programmed IPL in response to a $END card, the Monitor will find SYSIN properly positioned for the first job of the next batch.

b. If SYSOUT is tape, the NOSS Monitor will always, during end-of-batch sequence (unless terminated by emergency dump), write tape marks and position tape so that the operator may, between batches, either:

   1. Remove the SYSOUT tape for tape-to-print operation, confident that the Monitor has written multiple tape marks after the last output record.

   2. Leave the present tape mounted without disturbing its position, confident that the Monitor will record the output for the next batch separated by exactly one tape mark from the output for the last job of the previous batch.

NOTE: If a catastrophe prevented normal end-of-batch sequence from occurring, the NOSS Monitor may be IPLed and operator message IPL or REIP used to record multiple tapemarks on SYSOUT.